General Videos

The Power of Students Analyzing Sample Student Work
(5 minutes)

This video contains clips from two lessons, in which students examine sample student work, interspersed with clips of interviews with both students and teachers about this component of the lesson. The video shows several examples of students acting as instructional resources for one another as they analyze the sample approaches to solving the given problems. The first part of the video includes several clips of a teacher giving instructions for this component of the lesson. Below are quotes from several of the interview clips with teachers and students.

Teacher #1: What you're going to see is students who are nervous because they're afraid of wrong answers. And they also are nervous because they are not secure with their skills.

Student #1: I thought it was a very good process because we did the problem ourselves and then looked at different methods of doing it. And some of the methods were very different from what I did, so it showed me something else I could do in the future.

Student #2: Geometry is… overwhelming. Because you have to know formulas, how to find certain answers, and you can't use the same thing. Like you can't use the midpoint formula to find certain answers using the triangles.

Student #2: Today when I saw how Carla found her answer, and I actually sat there and thought about it, I realized that you didn't need to find the areas of the triangles.

Teacher #1: If we let them look at other students' work, when we pass out those problems and we see someone did what they did with the rulers, and then you see someone who did the comparisons and the ratios, then I think they'll begin to see it.

Student #3: Yesterday, I had no idea what I was doing. And so today, working with other people, interacting with different papers, I was like [pauses and claps], it was cool… Now I understand what I was supposed to do – and what I *can* do – for future situations.

The Importance of Homogeneous Grouping
(5 minutes)

In this clip, teachers discuss the use of homogeneous grouping in the Formative Assessment Lesson, *Solving Linear Equations in Two Variables*. Teachers divided students into three groups based on the results of the pre-lesson assessment: students who excelled on the pre-lesson assessment, students

who were able to get through about half of the pre-lesson assessment, and students who got stuck very early on.

A teacher describes some of the students grouped together for the lesson: "One of the groups of students that we had was three students that were grouped together. They have just typically always been the weaker students in math. The whole… since 6th grade here, you know, they realized that they're weaker. They had come to us yesterday when we made the groupings and they said 'What are we going to do? There is nobody smart in our group to help us'." At the end of the video, this teacher reflects on how the group did with the lesson: "Even though we were there to support them and prompt them through certain points, I think that today was a huge, a huge day for them. Because they had built confidence."

One of the students in this group reflects on his experience in the lesson: "Once we started working in our groups I felt more confident because I could always ask my table-mates if they had any advice, or any other way to do it, like maybe guess-and-check, or another… another type of [he looks to his partner, who suggests 'method'] method, yeah, method."

Another teacher reflects on non-homogenous grouping, saying, "…when we do group them with the stronger student and with someone who is a little bit weaker, they always look to the other student to kind of fill in the holes. And then they don't always recognize where they were lacking as much as they would in this kind of setting."

ESAE-Evaluating Statements About Enlargements A Teacher Listens
(3 minutes)

This video begins with a teacher listening to a student and giving him feedback on his work. It then shows other interactions happening during the lesson, interspersed with clips of interviews with the teacher and the student in the first scene. Their comments speak to the importance of students taking responsibility for their own learning; some of their comments are included below. Near the end of the video, the student explains the disadvantages of having a teacher walking students through a problem to the right answer.

Student: I like problems that I can figure out myself. I don't really like the teacher to help me.

Teacher: I think that by having the students engaged in the activities, and the concepts, and with a common goal, if everybody's on board, there's no way that the children are not going to be successful. You are in charge of your own learning.

Teacher: They can start producing work in many different ways. If you can draw it, go ahead. If you can write it, go ahead. If you can explain with a super brilliant formula, go ahead. Everything is acceptable and respected, and everybody learns from it. At some point someone approached me and said, 'Where are the special education children?' They were totally involved in the task, participating with no barriers, and

being able to share their work. That was a very nice indication that this program is pretty accessible from different points.

Student: When the teacher walks you through it, you understand, but… it's easy to forget. If you spend your time working out a problem and, getting the wrong answer the first time and then getting the right answer, you consciously know that you got the problem right, and you remember how to do it the next time.

IAE02-Interpreting Algebraic Expressions High School Students Reflect on the Classroom Challenge
(5 minutes)

This video begins with an interview clip with two students who self-identify as 'slow at math' and 'the weakest at math'; they each refer to his/her mom as being the same way. The video shows a group of students working on the Collaborative Activity, matching *Expression* cards with *Words* cards. The students appear to act as instructional resources for one another, and seem to enjoy themselves in the process, laughing as they argue with each other.

One of the students interviewed explains her difficulty with math: "It's like I can do something, but I forget. I learn something, I remember for the day, but the next day, I forgot. It's just getting harder and harder and harder. It's getting harder." Later, she continues, " I can learn something, like today I learned something. Tomorrow I'll remember it, the next day it will be 'blah'. It's just hard for me to remember the steps."

The other student from the initial interview clip states, "I have a negative feeling toward math. So, I be sayin' 'I can't do this. I gotta get the teacher's attention and she gotta tell me the answer'. I be sayin' that at times." In a clip soon after, this student explains the *Expression* card 2(n + 3) to one of his partners, "You see the 'n plus three' are in parentheses, so, and the two is outside, *means* multiplication. It perfectly matches." The students smile and laugh at themselves.

The video includes a scene in which the teacher instructs students on using the blank *Words* cards to represent the expressions that don't have matching *Words* cards.

IAE03-Interpreting Algebraic Expressions Special Educational Needs Students Excel
(7 minutes)

This video shows pairs and small groups of students in a "resource" class working on the Collaborative Activity, interspersed with clips of interviews with two teachers and a student. Some groups are matching *Expression* cards with *Words* cards, while others are further along and matching *Table* cards to corresponding pairs of *Expression* and *Words* cards. The teachers provide feedback to some groups as they work.

A teacher explains the prior work her students had done related to the content of this lesson: "What we have been learning in the past is how to solve for a variable. And just one-step and two-step equations, real simple things. And we've probably worked on that for about two months now. Today we were talking about the table, where we're having expressions with letters in it, and evaluating them. And they have evaluated expressions but not in terms of a table, where they would actually end up graphing it."

The other teacher interviewed describes what he sees as a struggle when these students first come to the school: "I'm not sure exactly how much they're either challenged or expected to do things on their own previous to coming to school here. And that's a big change for those students. They… you get a lot of, I guess, backlash, the first bit. They're really disgruntled and don't want to because they haven't had to do that."

The video includes one clip showing a teacher giving feedback to a pair of students to help get them started matching the expressions to *Table* cards, beginning with the expression $2n + 12$. Later, this pair of students is shown working independently of the teacher to find an expression to match a different *Table* card. Here is an excerpt of their conversation:

Student 1: We could try this one [points to the $n^2 + 6$ card]. Do you think that would be it? Three [points to the *n* in the expression] squared [points to the exponent, 2]. Nine [begins counting on fingers], ten, eleven, twelve, thirteen, fourteen, fifteen. [Camera shows table, in which 3 and 15 are corresponding values] Then put four? Four squared [points to n^2 quickly then tries to count on fingers, whispering]. Four… [hesitates] So, that's basically like four times four. Is eight [counts on fingers], nine, ten, eleven, twelve, thirteen… [trails off]

> Student 2: Four times four?
>
> Student 1: Four squared [hesitates]. So it's like… isn't it four times four?
>
> Student 2: [whispers] Sixteen
>
> Student 1: That's sixteen? [counts on fingers] Seventeen, eighteen, nineteen…

In another clip, the other teacher gives feedback to a pair of students who are working to interpret 'Multiply *n* by three, then square the answer'. They are considering both $3n^2$ and $(3n)^2$.

The teachers each describe the shifts undertaken by their students in taking ownership of their own learning. They attribute this to allowing students to have a productive struggle instead of walking students through the problems and expecting them to repeat what they're shown.

Questions and discussion points for participants to consider

The Power of Students Analyzing Sample Student Work

1. How do students serve as instructional resources for one another? Be specific.
2. How do students develop in their reasoning about the problems?
3. Do the students in the video seem to fit the teacher's characterization as 'nervous because they're afraid of wrong answers' and 'insecure with their skills'?
4. What advantages did analyzing sample student work provide for these students? Be specific.

The Importance of Homogenous Grouping

5. What were the benefits of homogenous grouping for the students featured in this video?
6. How did the students in this group serve as instructional resources for one another?
7. What does it mean to have a group work well together?

ESAE-Evaluating Statements About Enlargements A Teacher Listens

8. Discuss the nature and quality of the teacher's interactions with her student.

IAE02-Interpreting Algebraic Expressions High School Students Reflect on the Classroom Challenge

9. How are students acting as instructional resources for one another? Give specific examples.
10. What evidence of student learning do you see? Give specific examples.

IAE03-Interpreting Algebraic Expressions Special Educational Needs Students Excel

11. Discuss the teacher's strategy for giving feedback to students.
12. How useful do the students find the feedback and why?
13. How does this clip impact your plan for enacting the lesson? Be specific.