Description: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Two of Seven: Clip 6 of 6, The square of (a+b), how to imagine each piece? Parent Tape: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Two of Seven Date: 1996-01-29 Location: Harding Elementary School Researcher: Carolyn A. Maher	Transcriber(s): Aboelnaga, Eman Verifier(s): Yedman, Madeline Date Transcribed: Fall 2010 Page: 1 of 4

Line	Time	Speaker	Transcript
1		R1	*a* squared. In your head, do you know what you're imagining here? In this piece? [*indicates the lower left corner of the $(a + b)^2$ model Stephanie drew*]
2		Stephanie	Well, it's just this square would be *a.*
3		R1	Right.
4		Stephanie	It would just be like this piece right here. [*Stephanie traces the a^2 section of the model.*]
5		R1	Tell me about this piece. What does this *a* squared mean for this piece?
6		Stephanie	It means that that's like the area of the piece.
7		R1	Right. But what am I supposed to imagine in my piece.
8		Stephanie	There's *a* squared number of units uh square units.
9		R1	Okay.
10		Stephanie	In there.
11		R1	And what's the length of one?
12		Stephanie	One.
13		R1	Okay. So you have two, three, four, five, dot, dot, dot [*marks off intervals along the left side of the a^2 section*].
14		Stephanie	Um hm.
15		R1	Each of these is one.
16		Stephanie	Yes.
17		R1	And you have that many and (inaudible)
18		Stephanie	And the squares would be one square unit.
19		R1	Okay. What about this? This is not a square. [*indicates the $a \cdot b$ rectangle in the upper left corner of the model*]
20		Stephanie	It would – [*makes a noise*] – um so wouldn't it be there'd be *ab* number of square units and - would each one still be one?
21		R1	That's an interesting question. I want you to think about – now this is *b*. [*traces the line segment labeled b on the upper left side of the model*] the way you made the picture, do you have more of these [*the b's*] than you have of these [*traces the a edge of the $a \cdot b$ rectangle in the upper left corner of the drawing*]

22		Stephanie	Um. No. I have more – well *a* is larger.
23		R1	*a* is larger than *b*. Okay.
24		Stephanie	So there's more
25		R1	Okay. But what's, if I have one of these?
26		Stephanie	Like what do you mean? Like if there's one divider?
27		R1	Well, I have *b* of how ma- I have *b* of something here.
28		Stephanie	Yes.
29		R1	What what are these things I have *b* of?
30		Stephanie	Units.
31		R1	Units. And so I have a unit here. I keep going until I have *b* of them. Right?
32		Stephanie	Yes.
33		R1	And here, I keep going until I have *a* of them. Right?
34		Stephanie	Yes.
35		R1	So if you can imagine these. [*marking off intervals on both sides of the* $a \cdot b$ *rectangle as she is speaking. Then she extends the lines to give the impression of square units.]*
36		Stephanie	Um hm.
37		R1	So what does what does the the *ab* have to do with it? How do I get *ab*?
38		Stephanie	Well, that's how many units there are.
39		R1	What does that (inaudible)
40		Stephanie	Square units there are
41		R1	Why?
42		Stephanie	Because um [*pause*] Oh! Um! Because there's *a* number of units here [*along the top side of the* $a \cdot b$ *rectangle*]
43		R1	Um hm.
44		Stephanie	And okay. There's like if this is what it is, right?
45		R1	Um hm.
46		Stephanie	Like if this is that piece [*redraws the* $a \cdot b$ *rectangle on the upper left side of the paper*] this is *a* and this is *b*. [*labels the longer (horizontal) side of the rectangle A and the shorter (vertical) side of the rectangle B*]
47		R1	Um hm.

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48		Stephanie	There's *a* number of units here, like this part [*traces the air over the side she labeled A*]
49		R1	Hm.
50		Stephanie	and there's *b* number of units here [*vertically*],
51		R1	Um hm.
52		Stephanie	so if you mult and you want to get like this square. [*sectioned off what looks like one square unit at the left side of the rectangle she drew*]
53		R1	Um hm.
54		Stephanie	And that's *a* [*touches the top of the square she sectioned off*] times *b* [*touches the left side of the square*] and there's like that many number [*marks off 2 more squares by drawing vertical lines through the rectangle*] and that would be *a* times *b*, so you'd have
55		R1	But this is not *a*. This is one and this is one.
56		Stephanie	Well, yeah, but
57		R1	It's just that you have uh *a* of these ones [*indicates horizontally*] and *b* of these ones. [*indicates vertically*]
58		Stephanie	Yeah.
59		R1	So I'm trying to understand, how do you get *ab*?
60		Stephanie	*ab* what? Like?
61		R1	As a total number of square units in that section.
62		Stephanie	In this whole
63		R1	Yeah.
64		Stephanie	thing?
65		R1	Yeah. [*pause*] Well, suppose you thought of *a* and *b* being particular numbers.
66		Stephanie	Um hm.
67		R1	Suppose *a* were five and *b* were two.
68		Stephanie	Okay.
69		R1	You know ahead of time
70		Stephanie	(inaudible)
71		R1	without thinking that you're going to get
72		Stephanie	Ten.

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73		R1	How many of those little squares? Ten. But I want you to be able to imagine how those ten get generated when *b* is two
74		Stephanie	Um hm.
75		R1	and *a* is five. I want you to really in your mind to try to think of how they come about. 'Cause because this is the kind of power that's going to help you in mathematics as you move along. Not just to say that there are *ab*. Let's not worry think about that. That's a fast way to get an answer, but how are they coming? That's that's the real way you're going to develop this ability to do higher level mathematics.