Description: Early Algebra Ideas About Binomial Expansion, Stephanie's Interview Two of Seven: Clip 2 of 6, How could one represent a square geometrically? **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 5**

Line	Time	Speaker	Transcript
1		R1	Um hm. So. Um. Well, there are a couple of ways directions to go. One direction we went last time was to think of of this as um an area problem.
2		Stephanie	Um hm.
3		R1	You know, if I asked you to represent *a* squared.
4		Stephanie	With the you mean with the box that we did last time?
5		R1	Yeah. How would you represent *a* squared? Let's get another piece of paper. Can you draw me a picture of what *a* squared could be?
6		Stephanie	Um. Do you want it to represent like one side of the – 'cause that, I'm trying to think how we did it?
7		R1	Does anything come to your mind when you say *a* squared?
8		Stephanie	Just well *a* times *a*.
9		R1	All right. That's true. But can you think of in geometry, what that might represent? [*pause*]
10		Stephanie	Not like – I don't know like what you mean.
11		R1	What I'm what I'm fishing for? Let me be more direct than that. Okay?
12		Stephanie	Yeah.
13		R1	If that were a square,
14		Stephanie	Yeah.
15		R1	Right? And this side had length *a*.
16		Stephanie	Um hm.
17		R1	And this side had length *a*.
18		Stephanie	Um hm.
19		R1	If you were finding the area of a square? Remember?
20		Stephanie	Um.
21		R1	How do you find area of a square?
22		Stephanie	Multiply the two sides.
23		R1	Length times width. Right?
24		Stephanie	Um hm.
25		R1	In this case or side squared? So if one side is *a*, right?

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26		Stephanie	So it would be
27		R1	And the other side is *a*, so the area is?
28		Stephanie	*a* squared.
29		R1	*a* squared, right? Remember that?
30		Stephanie	Um hm.
31		R1	So when you were in lower grades, you'd be finding area where you had, find the area of square of side, when the length of a side maybe is 5 units.
32		Stephanie	Um hm.
33		R1	So what would the area of that square be?
34		Stephanie	Twenty-five.
35		R1	Twenty-five square units.
36		Stephanie	Um hm.
37		R1	All right? Does that make sense?
38		Stephanie	Yeah.
39		R1	Uh. I wonder why that works? What that what that means?
40		Stephanie	Like why *a* like length times width works? Or?
41		R1	Well, I wonder if um if I didn't have an *a*. Suppose I made a three, right?
42		Stephanie	Um hm.
43		R1	Okay. One, two, three. [*marks off three intervals on the sides of a square*] This is – can you imagine these being the same size?
44		Stephanie	Okay, so all
45		R1	So this length of this side is three units.
46		Stephanie	All the little sections are
47		R1	This is three units, right?
48		Stephanie	In each one is one? Like each of the little sections is one?
49		R1	Yeah. Can you tell me what I mean when I talk about the area? What's the area of that square?
50		Stephanie	Um. Isn't that-
51		R1	If this side is three units and this side is three units?
52		Stephanie	Nine?

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53		R1	Nine what?
54		Stephanie	Nine square.
55		R1	Can you draw me a picture of that? To show that? Nine, you told me, nine square units. So show me those nine square units.
56		Stephanie	Um. Like if each one of these – oh! You want me to [*draws two verticals and then the two horizontal lines which divide the square into nine square units*]
57		R1	So what's the area?
58		Stephanie	Nine square units.
59		R1	What's a square unit?
60		Stephanie	One of these little squares.
61		R1	Okay. And that little square, right? See that little square there? [*colors the top left unit square blue*]
62		Stephanie	Um hm.
63		R1	What is the length of one of its sides?
64		Stephanie	One?
65		R1	One. So you see, this is really a square unit. It has one, one. It's a one by one square and look how many of them are in here. There are nine of them.
66		Stephanie	Um hm.
67		R1	Right? So that square has area nine square units. So – if we were thinking about *a* squared,
68		Stephanie	Um.
69		R1	How does – what does that have to do with this? It looks like a nine. [*indicates the a label on the left side of the square*] Maybe an *x* would have been better.
70		Stephanie	You want me to show you *a* squared? Or?
71		R1	Yeah.
72		Stephanie	But you have it, like here.
73		R1	Yeah. What would it look like in the picture? [*pause*]
74		Stephanie	[*noise*] Um. [*pause*] I
75		R1	It's a big leap, isn't it?

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76		Stephanie	I don't know, 'cause there's no like number to work.
77		R1	Yeah. Right. So.
78		Stephanie	I can't draw anything 'cause there's no no number to like separate any thing with or to like square it off in like little
79		R1	Hm.
80		Stephanie	sections, you know?
81		R1	So if I gave you a number would you be able to do it? Pick a number. And do it.
82		Stephanie	Well, if it was like four, right?
83		R1	Hm.
84		Stephanie	And I could divide it each into four parts,
85		R1	Um hm. Um hm.
86		Stephanie	then I could show you
87		R1	Um hm.
88		Stephanie	like what four squared looked like.
89		R1	Um hm.
90		Stephanie	But because *a* has no number
91		R1	Um hm.
92		Stephanie	I can't just like make *a*, like you, 'cause you're asking me what *a* is.
93		R1	Um hm.
94		Stephanie	You're not asking me what like four is.
95		R1	Um hm.
96		Stephanie	And I can't just like materialize like *a* is this
97		R1	Hm.
98		Stephanie	is like this
99		R1	Yeah.
100		Stephanie	extra number or something.
101		R1	That's the same problem here, isn't it?
102		Stephanie	It has parts.
103		R1	It's sort of the same problem. You're dealing with these these letters here. Right? In the sense, when you have an *a*, it's not a two. Or it's not a three.

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104		Stephanie	Um hm.
105		R1	Or it's not a five or a seven or a half or a third or whatever? Right?
106		Stephanie	Um hm.
107		R1	It's gotta stand for whatever you want it to be. Isn't that right?
108		Stephanie	Yeah.