

Constructing, Testing and Re-constructing Theories

[Music]

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>> The following video segments are intended to provoke your thinking as educator teams about learning. We invite you to position yourself in a learning stance and consider these questions as you reimagine literacy and numeracy throughout the day.

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Constructing Theories about Quantity, Spatial Sense and Algebraic Thinking

[Background Discussion]

^M00:00:02

>> It goes up to seven steps. And they can go to that many steps if they want. One, two, three, four, five, six, seven. One, two, three, four, five, six, seven.

>> In this video segment, we enter a child's play in progress. He has created a growing pattern and has labelled each part with a numeral card to match the quantity of block in each tower. As he attempts to build the next predictable part of the pattern, he encounters a problem.

>> The eight fell down.

>> Oh, so that's a problem. How could you solve that problem?

>> I don't know.

>> What do you think made it fall down? Do you think it was the mat? Do you think the mat is bumpy?

>> Yeah.

>> Do you want to try this work on something else? What would be a smooth surface where it won't fall down?

>> Or I can just pull them a little.

>> You could pull it a little?

>> So, it's just flatter.

>> OK. Do you want to try that?

^M00:01:23

[Background Discussion]

^M00:01:37

>> Now it's flatter there.

^M00:01:41

[Background Discussion]

^M00:01:51

Two. ^M00:01:53 Three. ^E00:01:55 ^B00:01:57 Four. ^M00:02:00 Five. ^M00:02:04 Six. ^M00:02:08 Seven. ^E00:02:11 ^B00:02:14 It falls down.

^M00:02:16

>> It falls down? ^M00:02:18 What if you, what about this? ^M00:02:20 Feel this, and see if you think that would be different.

^M00:02:24

>> On that?

>> Do you think so? Do you want to try it?

^E00:02:27 ^B00:02:31

>> One. ^M00:02:34 Two. ^E00:02:36 ^B00:02:40 Three. ^M00:02:43 Four. ^M00:02:46 Five. ^E00:02:48 ^B00:02:52 Six. ^M00:02:54 Seven. ^E00:02:56 ^B00:02:58 Eight.

^M00:03:00

>> Did it work? Yeah. ^M00:03:03 So, what about these ones now?

^E00:03:05 ^B00:03:08>> I have to move it.

>> Do you want to move them? ^M00:03:11 Yeah? Which one are you going to start with?

^M00:03:15

>> One.

>> OK.

^M00:03:18

>> Oh, the two fell down. ^E00:03:20 ^B00:03:26 I think the one goes that far.

^M00:03:30

>> So you thought the one goes this far?

>> Yeah.

>> Why do you think you have to put it all the way over here?

^M00:03:36

>> Because it was right here before.

>> So, are you kind of estimating how much space you'll need here?

^M00:03:46

>> Yeah. ^E00:03:47 ^B00:03:50 I'm trying to find out how much space I need.

^M00:03:55

>> Trying to find out how much space you need.

^M00:03:57

[Background Discussion]

^M00:04:14

>> The three is hard.

>> Mrs. [inaudible].

>> Oh. Do you want to sit down with me? So, what did you notice about the geranium?

^M00:04:29

>> It moves its head [inaudible] pink on it, ^M00:04:36 then red [inaudible], and there's [multiple speakers], ^M00:04:47 and this is green and these are green.

^M00:04:52

>> [Inaudible] in there, and there was [inaudible] like an X in the middle.

>> Really? See, I had lilies disappear at night, but I have a theory about who took the lilies.

>> Yeah, but.

>> There's a certain animal in town that seems to be eating flowers from gardens.
[Multiple Speakers] ask your friends.

>> Animals dug up my garden and then put it in my other front yard.

>> Three.

^M00:05:24 >> Why don't you ask if this has happened to anyone?

>> And there was, and there was.

^M00:05:28

>> Seven.

>> There was an X in the middle, and there was dug up holes all around it.

^M00:05:31

>> Eight.

>> Kianna [phonetic], would you like to make a survey to ask ^M00:05:35 your friends if they've ever lost flowers in the night?

^M00:05:38

>> Six.

>> Yeah?

>> Let's go find you a clipboard.

^M00:05:41

>> Eight.

>> And it looks like a whole pyramid coming up ^M00:05:45 [multiple speakers] that

looks like [multiple speakers].

>> Oh. We're going to find out if this as happened to other people.

^M00:05:50

>> Six or nine?

>> Count [multiple speakers].

^M00:05:54

>> One, two, three, four, five, six, seven, ^M00:05:58 eight, nine. I used the nine to do the six.

^M00:06:06

>> Oh, you used a nine to do the six? OK. Why do people get six and nine mixed up?

^M00:06:13

>> Because they can go the same ways.

^M00:06:17

>> So, you found that out. You might need to look for a six now.

^M00:06:20

>> I dig holes where my pool was, but now I had an animal ^M00:06:29 pool and then like my [inaudible] in it, and [inaudible].

Communicating Understanding

>> I got nine up there.

>> That's impressive. What comes after that?

^M00:00:05

>> One, two, three, four, five, six, seven, eight, nine and then ten because it goes from one and then two blocks and then three blocks, then four blocks, then five blocks, then six blocks, then seven blocks, then eight blocks, then nine blocks. Bigger and bigger and then you need to stack up the blocks, they get a bigger numbers.

^M00:00:37

>> That's interesting.

^M00:00:39

>> And this is a nine and this stood up to a nine but this is [inaudible] need a six anymore. Six, this looks like nine 'cause they can go that way or that way.

>> Wow.

^M00:01:02

Integrated Learning in Mathematics

[Background Conversations]

^M00:00:04

>> Now you're trying to measure it, how tall it is.

^M00:00:06

>> Yeah.

^M00:00:08

[Background Conversations]

^M00:00:14

>> So one thing I notice when the children are engaged in numeracies, there's a real integration of strands of math. I don't see them as isolated. He's adding layers of complexity to his work. He, you know, is incorporating measurement and he's incorporating numbers and he's incorporating order and I think there's a real richness when things are not taught in isolation. I offered him these materials. I placed them beside but I didn't say anything. I wondered if he was going to use them to, again, count and he surprised me with this idea of using the materials to measure so, you know, the children are continually amazing us with their own ideas and it just really speaks to us having to let go of our agenda with things.

The Power of Wait Time

[Music]

^M00:00:19

[Background Discussion]

^M00:00:30

>> Quentin, look what I notice. What do you think? Is that, is that strong?

>> Yes.

^M00:00:37

[Background Discussion]

^M00:01:06

It's just that I made a little square.

>> A square instead of a rectangle. How do you think that's going to make it stronger?

>> Because then, because then only some of it will fall.

>> Do you think, I think it might be a little stronger because you don't have so many blocks to move apart. What do you think?

>> Yeah.

^M00:01:41

[Background Discussion]

^M00:01:53

>> Do you think it's really important that these are fit, total fit together?

>> Because, because if it was, because if it was almost broken, if it was right there to the edge.

>> Yeah.

>> And I touched it by accident, then it would fall.

>> So, it's important that they're fit together? I want you to look over here, and see what's happening over here.

^M00:02:22

[Background Discussion]

^M00:02:36

Oh, you want me to put it over here?

^M00:02:41

[Background Discussion]

^M00:03:32

Wow. Come look at what.

>> I know.

>> How is that, how is that balanced?

>> I balance it in, I balance it in.

>> In the other block?

>> Yeah. I put it in gently.

>> Oh.

>> Is what I was trying to do is I was trying to do that.

^M00:03:59

[Background Discussion]

^M00:04:13

>> That's okay.

^M00:04:14

[Background Discussion]

Seeing Children's Working Theories in Action

>> So he's built the same structure, three -- keep going Quinton, that's fantastic. We've built the same structure three or four times. It started out bigger, and it kept falling over, it was too wobbly. So it's gotten smaller. And I just kind of want to capture how he's figuring this all out. The first time he had two blocks, so it was, he had built a rectangle, and it was way too wobbly. And, like I wanted so bad to tell him, just make it a square, there are less kinks, it'll be so much easier, but it fell down, he built another rectangle, fell down again, and I didn't have to say anything, but we had talked about what Campbell said at the circle, is when things are smaller, they're less tippy and they are stronger. And every time, I notice that he puts the interlocking pieces closer together.

^M00:00:50

>> Okay.

^M00:00:51

>> Because before they were kind of, some were totally in, some were half in.

>> And is he getting frustrated at all?

>> Not really.

>> He just keeps going.

>> He has that little, you can tell he's upset when it falls, but then he just gets it right back up and keeps going.

>> And so you can see that he's learning, because he keeps changing it, each and

every time, making it better.

>> I can see now that the pieces are interlocked a lot closer than they were before.

>> Okay.

>> So he's, yeah, he's learning that they need to be together so tightly in order to keep it sturdier.

The Instructional Core

>> [Background Music] Educational researcher, Steven Katz, encourages us to think about learning as a shift in thinking and action. Part of the shift in thinking and action for educator teams is to consider the connected and interdependent relationship between the learner, the learning environment, and the learning. Richard Elmore refers to this as the instructional core. Pedagogical documentation plays a significant role in reflecting the learner and informing future pedagogical moves. Let's listen in to the educators from the previous video segments discussing the thinking that informed the classroom practice just viewed.

>> How do we know that the children are learning? Because when I first started, I felt like I had to document what they had done, what they had to say about it, to prove that they're learning. So I think that was a huge hurdle for me to get over, was just to kind of think about how are they learning?

>> So, when we look at children's learning, we, we look at what they're saying, what they're doing, and how they are representing it. And I think, today, we had some really keen ideas that came from the children. We look at the one little boy that was working on building his structures, and he had that sustained focus.

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>> Well he was solving, he was solving problems as he was working, right? So something would happen, he would make a move, correct, and move on from there, right? He just, he was problem solving as he was going and that's why he was so engaged, because he had something, you had challenged him, and he was trying to work through that.

>> Well, and, and what he was building kept breaking. It fell apart three times before he decided to change his, his structure a little bit. So he went from using, he went from a rectangle, with blocks, to a square, so he made his structure smaller, and it had less intersections in it. And so that immediately made it sturdier, and, so he just kept building

and it broke again, but I think that resiliency, like he was so focussed and he had, he had his idea, and he just, he wanted to make it happen. But he kept thinking back to, okay, well, last time it broke because of this, so then he'd fix it, and then he'd kind of make another mistake, and then it would fall apart, as it got higher, it'd start to fall down, and so he just kept kind of reflecting on what he had done in the previous trial, and fixing it, and then, so it kept going like that. And finally, when we came back from lunch, he said, remember that thing? That I was trying to build? Well look! I just built it! And it had been standing for about 20 minutes already. So no one was allowed to touch the table [laughter].

>> He had, he had, he had his success.

^E00:03:01

Noticing and Naming Learning

>> Like our time, you know, with children and, and learning to really listen to children, has helped us to develop a better ability to, to name learning and to notice things with them and to, you know, offer them that reflection. So they're becoming more aware of their own work, you know, shifting from something simple to something more complex.

>> And I think we can tell that they're learning by, you know, they come up with new thoughts. They have new questions. They want to share with their friends. Come and see what I did, come and, or share with us, and, and, you know, they'll often repeat the same work over and over again. Like I think of the little guy with the spiral, like for us, that was a big -- wow, he, he was, he was listening and he was engaged, even though he didn't speak during the group, he recreated that spiral so many times with so many different materials, it was -- it was a pretty --

>> I think the, my favourite indicator is, is that their eyes light up, and they're full of joy. And that's, that's what I try to take home with me at the end of the day, is, is that their eyes were lit up.

>> Like they've made these huge discoveries and they can't wait to show everyone what they've come up with.

^M00:01:31

>> I love when I come into the room and the kids are rethinking what they have already done, and I watched a lot of them, and they will take something that they have done, and make it so that they're happier with it, that it represents what they're doing more authentically. So if they were, if they were copying a picture and they realized that they had put the colors in the wrong spots, it's not that anybody came to tell them that. You, you watch them and, and they change their picture around, so that it more represents what they were looking. And so it's that rethinking, they're rethinking and they're

reprocessing what they're doing, and they're moving themselves forward. I don't think there's any child that I've ever come into the classroom that I can say, in the years that we have been doing this, that have ever not see moving, move forward. Every one of them is so excited to be there. I've never had kids coming up and I've had to phone home because they're crying and they want to go home. Usually when we had kindergarten, I didn't want to go down in there until November because the crying didn't stop [laughter]. Now, it's like as soon as September comes, you have the older children, they're helping the younger children, and they have this team approach, and the classroom is a team and everybody in that classroom is worried about the next person, and they're trying to help the other person move forward, whether it is a verbal engagement, whether it is just watching what they're doing and asking if they can join in. I'm always amazed at that. So it, it's a wonderful experience to be a part of.

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Re-imagining the Learning Environment

[Music]

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>> How does the environment become --

>> The third educator.

>> Right.

>> Well, I think because the children are obviously competent in being able to explore and interpret and make meaning on their own. The environment really just supports them in doing that so we can be very intentional with materials that are more conducive to that type of learning, you know, and I think we especially see that occurring with numeracy by offering materials that have, you know, different lengths, different sizes, different shapes, textures, colours, you know, we're able to use those materials to add complexity to whatever is taking place. So, you know, we had an experience this morning where a child was working with blocks and working with numbers and, you know, even without explicitly saying anything, I placed something, you know, nearby just an invitation and he, you know, noticed it and was able to incorporate it into his work and add a layer of measurement to what he was doing with numbers. So, you know, just that example really spoke to me about, you know, how the environment can support learning and I think often, you know, as a result of listening to the children and listening to what interests them, we can respond to them through environment and it's -- the nice thing about it is it gives us time to think and process about how best to respond.

>> I think in saying that, too, I think it's really important to change the environment often, you know, your kids' interests change, sometimes we'll notice when behaviour starts to change, we change the environment around and it completely changes the learning. It keeps the learning alive within, you know, the different areas of the room and we notice if something, you know, an area is not really being used, what can we do to change that to help bring that learning in and make the learning more complex.

>> We just did that in our class 'cause we felt like things were getting kind of stagnant, like they weren't getting out of their comfort zone, they kept playing with the same materials over and over and they weren't really branching out so we changed things around and just like challenged them to explore something new, something that they've never played with before, just take it out and start looking at it and start working with it.
>> When you change the environment, too, you can really see the learning change as well, and it's very important that we use those observations to realize that sometimes we just need to make small changes. They don't even have to be big changes, like adding more complex materials or more authentic materials certainly does change the way that children play.

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Reflections on Learning: Karyn Callaghan

[Music]

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>> When we're involved in reflective practice, we're questioning our certainties so the things that could end up becoming rote or just sort of a scripted response, we're disrupting that intentionally and again, involving ourselves in a constant inquiry into what we believe and why and does it fit in the situation so we have child development theory to guide some of our decisions but we should also be questioning that theory because it is theory and so we can become part of constructing knowledge about practice and not just consuming theory about practice.

Educators are making maybe hundreds of decisions every day about what to pay attention to, what to ignore, when to ask a question, when not to intervene, when to refer children to each other; all of those decisions reflect back to us our view of children and teaching and learning. So if we become accustomed to using questions as a lens, questions about what do I know about myself through decisions, we will then be on a journey of getting to be better and better as teachers all the time. And we can also invite our co-teachers to be critical friends with us so to intentionally seek out different perspectives because we're constructing knowledge together all the time so it's constant research, research about children, research about teaching as well, and if we become, just every day, accustomed to asking ourselves questions about why that decision and not this one and what does this show me, we will be constantly improving as teachers.

Provocateur is a wonderful word to describe our role and it's different from being a facilitator. Facilitator, of course, comes from the French facile, meaning to make easy. A provocateur is doing the opposite, provoking, becoming, in essence, a de-facilitator, if you want to make up a word, another word in French, making it more difficult and more

complex so it's looking for challenging questions, looking for the incongruities in what children are doing and saying, finding the soft spots in their theories so that we can live with those ideas a little longer, stay with them, ask those challenging questions.

Lovely example from our program, where a child had drawn a beautiful drawing of a sailboat and had shown it to the artist in the program and I know myself as an early childhood educator, I would have probably said that's a really nice boat and that would have been the end of it and the drawing would have gone home. The artist instead said, I'm not sure I'd get on that boat and the little boy said well why not. And Jay said well, I can't see how it goes and I can't see how it stops so the little boy pulled his drawing back and started adding things to it. He added three winds, he added a porthole that was closed and that's where the sailors were sleeping and a porthole that was open and that's where they were there reading their books. He drew an anchor and attached it to the side of the sailboat and showed it back to the artist, who said I can see how it goes now, I can see that there's an anchor to make it stop but I don't see how the anchor works, it's up on the side of the boat. The little boy then added a windless; he said it's a hose pipe kind of things, just like you'd have at the side of your house for wrapping up a hose. And that's how the anchor would go down. He had all of that in his mind but we wouldn't have known that from his drawing so being a provocateur, you're going a little bit further to see how the child is making sense of this, what more they know than has come out in that situation so that we can then take those ideas to other children or go further. He, in fact, ended up translating that drawing to a three dimensional model. He brought back a tuna can from home and some rope and plastic spoons so that he could construct into it an actual working model. So there's more than we might give children credit for so we have to make sure that we're not putting up a false ceiling but being comfortable asking those authentic questions so that we can understand what they understand and how.

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Deepening our Understanding: Constructing Working Theories About Patterning

>> >> As you watch the following video segments we encourage you to try documenting what you are seeing and hearing without judgment. Learning is complex and dynamic. Viewing the video multiple times provides an opportunity for you to think about what you are seeing and hearing from a variety of perspectives. The following reflective frames may be helpful to keep you in an inquiring mindset and assessment for learning stance. When I saw; I am thinking this is evidence of; when I heard; I wonder if it means; when I saw; I am thinking it might be evidence of the conceptual understanding in overall expectation.

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[Music]

^M00:00:59

[Inaudible]
^M00:02:33

Deepening Our Understanding: Constructing Working Theories About Measurement

[Music]
^M00:00:04
[Background noise]
^M00:00:33
[Music]
^M00:00:57