# Project_INSPIRE_Grades_2-5_Course_4_Lesson 7

DR. KIM ZEBEHAZY: Hello everybody, and welcome to "Lesson 7: Strategies for Developing Students' Thinking Skills." I'm Dr. Kim Zebehazy, and I'm an Associate Professor at the University of British Columbia in the Blindness and Visual Impairment Program. And I'm doing a lot of thinking about how to develop the thinking skills of students with visual impairments. It's a passion of mine, and I'm going to share with you some of the things that I discovered or find helpful for us as teachers, working with students.

Slide two shows our lesson objectives for Lesson 7, which includes being able to identify different "types" of thinking and how they can help develop self-regulated learning that can be applied to reading graphics, and also describing ways to infuse thinking opportunities into instruction with tactile graphics. So on slide three, let's start by talking about why should we deliberately think about thinking.

I know from my own experience as a teacher as well as my experience observing student teachers that incorporating opportunities for thinking on the fly rarely works. We often tend to default to lower-level knowledge-based skills, like, what is that? What is this? And the higher-level skills that actually are the ones that give students the opportunity to develop thinking skills are often left out.

If we do focus more on thinking skills, we can transfer those for the student across content areas and life tasks, and it also promotes active engagement. So here on slide four, let's talk about the types of thinking. This is, by far, not the only way to categorize the different types of thinking, but this particular layout I find useful to me as a teacher when I'm trying to make sure I'm incorporating opportunities within my lessons.

The first is flexible thinking. So, this is thinking about, "Can I think differently about a situation? Can I assume the viewpoint of someone else?" So can I change my mindset to look at it from a different point of view, basically. Fluent thinking is my ability to come up with various solutions. It's kind of that ability to brainstorm and come up with lots of different solutions. And. "Can I identify a variety of tools to accomplish a procedure or solve a problem?" Elaborative thinking is similar, but it's taking what I know and adding to it. It kind of takes something I already know, a strategy, perhaps, and add to it to make it better, to make it fit the particular situation I'm now encountered with. "Can I analyze and compare to come up with the next steps?" And then original thinking. This is your creativity, your creative thinking. "Can I come up with new and different ideas?"

All of these types of thinking combined help us promote self-regulated learners. Here's a diagram on slide five that shows the strategic actions cycle. And this is the cycle that students go through when they're being self-regulated learners. And it begins with being able to interpret the task. So being able to articulate and state, what is it that I'm supposed to do here? And then coming up with a plan, and based on that plan, enacting the proper strategies in order to accomplish that plan. So, looking in my strategy toolbox and pulling out the ones that are going to work in this particular situation.

And then as I'm enacting those strategies, being able to monitor myself or evaluate how well is it going, and based on that, adjusting accordingly. So this is a full cycle. And in order to develop self-regulated learners, we have to give our students lots and lots of opportunities to practice this full cycle, to go through the whole thing. I find it useful to think about this cycle in developing lessons in terms of where I can ask students different questions to help them think about each of these particular aspects of being a lifelong learner, in fact.

Now this ability to engage in the strategic action cycle depends on some other things. So here on slide six we add in the learning environments. So that's where you, as a teacher, have a lot of ability to help promote this for students. It has to do with how you develop the tasks and the learning and the, the lessons. It has to do with the types of feedback you provide students, and it has to do with any kinds of support you have to help scaffold them up to more and more ability to think on their own and be more independent with it over time. Students aren't going to be able do that naturally, necessarily. From the beginning, we need to give them opportunities and help them develop it.

Students will also bring emotions and motivation to any task and any learning, so their ability to go through the strategic action cycle will be affected by emotions and motivation. It's a very motivating task. They may be engaging in that strategic action cycle more naturally. If they're fearful of the task, or they come in with feelings of inadequacy or feeling like they can't do it, they might, in that moment, need a little bit more support to think through. But in both of those situations, particularly in the fearful situation, giving them the opportunity to still work through that process with supports in place is useful.

And then there's what the learner brings to the task. So their level of metacognition, the knowledge they have about the task, their experiences with that type of task before, their strengths and their challenges, and their beliefs. So for example, when we're talking about tactile graphics learning, if a student has lots of experience with bar graphs, they're going to bring that to the strategic action cycle and they're going to be more quickly able to pull out the strategies that they can use. Whereas if they have had little experience, we're going to have to develop some of that knowledge and help them develop their strategies in their toolkit so that they can, then, over time, pull those out more readily on their own.

Some questions to promote the thinking around strategic action include these that I've listed here on slide seven. Interpreting activities-- so you can ask things like, "What do you need to do? How will you know you did a good job?" So, can the student articulate to you? We often don't give students the chance to make this explicitly stated, and as teachers, that helps us understand, as well, what is going on in the student's mind and how well they're actually understanding what they've been asked to do.

Choosing strategies, "What has worked in the past? What strategy did you use there? How will you approach this task?" or, "What is your plan?" are questions that can promote the student in choosing strategies. And then monitoring and adjusting phase, you can ask things like, "How are you doing? How do you know you're doing well or not well? What can you do differently to solve the problem?"

So I'm going to show you two videos to kind of model how we can scaffold students' thinking about strategies. So oftentimes we approach tasks trying to get it done. We're, we're outcome-oriented. Now if we flip that for the student, and become strategy-oriented, that's when we're building those thinking skills, and that's when we're building those tools that a student can use in various situations, including reading tactile graphics.

So, in the first video, my assistant, Rebecca, she does not have a visual impairment, but in these interesting times we're in, I wasn't able to secure a student with a visual impairment, so she nicely offered to be my student. She is going to be in these videos as we demonstrate different techniques and ways to go about different tasks. You'll see her working with a younger task, which is matching textured bones in a dog house, and we're going to talk about the strategy that she used before and the strategies that she might use again. So focus on what we're doing to try to scaffold her thinking to develop more fluent and flexible thinking about her strategies. And in the second video, similarly, we'll be talking about strategies for her to explore a tactile graphic or picture of a plant in terms of figuring out how to best count the number of leaves on that plant.

DR. KIM ZEBEHAZY: Alright. Hi, Rebecca. Do you remember this game you just played recently?

REBECCA: Yes, I do.

DR. KIM ZEBEHAZY: What do we do with this game?

REBECCA: We had to feel our hand inside and try to feel different textures and match them.

DR. KIM ZEBEHAZY: Okay, so just so the audience can see, we have different bones and they all have different textures and there's two of each texture in there that Rebecca had to match. So she did it for the first time the other day, and pretty good. She took four minutes to get all bones matched. So my question to you is, if you wanted to improve your time, first tell me what strategy you used when you were finding the bones. What were you doing?

REBECCA: Last time, I just tried to feel around for like the same two ones, or I'd pull it out and then I'd feel it and then go in for the other one, so...-

DR. KIM ZEBEHAZY: Okay, so you'd feel one and then go for the other one?

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Okay, so can you think of another strategy you might do that might--

REBECCA: I'm not sure.

DR. KIM ZEBEHAZY: Okay, what was the-- start by thinking about what the biggest problem was? Like what made it hard?

REBECCA: You couldn't see it.

DR. KIM ZEBEHAZY: Yep, you couldn't see it. We're, we're modeling for kids who don't have a lot of vision, so--

REBECCA: And that there was more than one. Like, the, like there was a pair for each.

DR. KIM ZEBEHAZY: Right, so there were a lot of them, right?

REBECCA: Yeah.

DR. KIM ZEBEHAZY: A lot of bones. So there are a lot of bones in there. And were some of them really similar? Or are--

REBECCA: Yeah. They're a lot like -- There was two that were very similar and hard to tell.

DR. KIM ZEBEHAZY: Which ones was it? Which section was it?

REBECCA: I think the fluff, like the fluffy, the soft ones?

DR. KIM ZEBEHAZY: Mm-hmm.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Okay. So if you wanted to reduce the number of bones in there so that you could have easier access to feel the different textures, what could you do first?

REBECCA: I guess I could get rid of the hard ones first. Like, do the hard ones first, and then--

DR. KIM ZEBEHAZY: Okay, that's one strategy. Do you think it'll be hard to find the hard ones when there, all the bones are in there?

REBECCA: Oh, I'll do it at the end, then.

DR. KIM ZEBEHAZY: Yeah, could you maybe, you could try the simpler ones first, right? You could also maybe modify the game. Do we have to have all the bones in there, do you think?

REBECCA: No, you don't.

DR. KIM ZEBEHAZY: You could probably do what?

REBECCA: Take the hard ones out? Or...

DR. KIM ZEBEHAZY: Yes, so you can make it easier, right?

REBECCA: Yeah.

DR. KIM ZEBEHAZY: To get used to the other textures. That's a good strategy. And then practice, right, before you get them all in there.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: What else?

REBECCA: You could-- I don't know.

DR. KIM ZEBEHAZY: Maybe, I'm thinking, I might maybe to start, we take one of each type out.

REBECCA: Oh.

DR. KIM ZEBEHAZY: So, you can feel, pick one to feel and then try to find the matcher. Do you think that might speed up our time?

REBECCA: Mm-hmm.

DR. KIM ZEBEHAZY: Okay. So we have taken one part of the matchers out. We did the easiest ones first.

REBECCA: Mm-hmm.

DR. KIM ZEBEHAZY: We won't put the hard ones in there until we practice.

Which strategy would you like to try?

REBECCA: We, the do that one at a time. Like, take one out and then--

DR. KIM ZEBEHAZY: So, keep half of them out and take one to feel? That one?

REBECCA: Mm-hmm.

DR. KIM ZEBEHAZY: Okay. Should we try it?

REBECCA: Yes. This might be a leaf.

DR. KIM ZEBEHAZY: Yeah. How many leaves are there?

REBECCA: 1, 2, 3. Three? I counted three.

DR. KIM ZEBEHAZY: Okay. You've found some of them, so one of the things when we're exploring a graphic, we want to try to be as systematic as possible so we don't miss things. It can be really easy to miss things. So what could your strategy be?

REBECCA: I could start from the top and then go to the bottom. I'm kind of counting all over the place.

DR. KIM ZEBEHAZY: Yeah. Yeah, try that.

REBECCA: Is this one?

DR. KIM ZEBEHAZY: Yep.

REBECCA: One, two, three, four, five, did I already count that, or no?

DR. KIM ZEBEHAZY: [INAUDIBLE] you didn't count that one [INAUDIBLE]. Okay, that's a little bit better. Try again. And start at the very top. Find a leaf. And your strategy is a good one, but maybe take one side of the plant at a time. So plants, you've explored real plants before, right? The leaves come out of both sides of the stem.

REBECCA: Yes.

DR. KIM ZEBEHAZY: The leaves come out of both sides of the stem.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Right, so where's the stem? Let's start with that. That will be our anchor point.

REBECCA: Right here is the stem.

DR. KIM ZEBEHAZY: Yeah. So let's start on one. Go all the way to the top until you find the first leaf. Follow the stem all the way to the top.

REBECCA: Right, this one?

DR. KIM ZEBEHAZY: More to the top. Keep on that stem. Oh, yeah.

REBECCA: Right here.

DR. KIM ZEBEHAZY: Okay, you can start with that one. That's good. So which direction do you want to go? Clockwise or counterclockwise? We'll use fancy words today.

REBECCA: Clockwise.

DR. KIM ZEBEHAZY: Okay, so going clockwise, just go nice and slow. Maybe use both hands so you don't miss anything and see if you can count them all. So, that's number one.

REBECCA: Number two.

DR. KIM ZEBEHAZY: Mm-hmm.

REBECCA: Number three.

DR. KIM ZEBEHAZY: Mm-hmm. Good. So, I liked, I liked your strategy of following the stem and then knowing that you're still on one side of the stem.

REBECCA: Number 4.

DR. KIM ZEBEHAZY: Where's that? Is that finger on the same side of the stem as your other?

REBECCA: Oh, no.

DR. KIM ZEBEHAZY: Yeah. Use your...yeah. Good. That's better. That's a good strategy. So, as you saw in those two videos here on slide 8 we're talking about that idea, again, of building the strategy tool box. So it hits all categories of thinking when you help students think about their strategies, articulate their strategies, build on the strategies they already have, and compare and contrast their strategies. We're doing all those different types of thinking-- elaborate, flexible, creative thinking.

And some of the prompts that we use to build that skill, some of these that you saw in the video was asking, what else could you do? What other strategy is there? What else? And then comparing those, well, how did that strategy compare to the other? Was it faster? Was it more efficient? Did it work out better for you? And pointing out when the strategy isn't working as well and having the student think through that and how they might modify. So you had trouble with whatever using that strategy, how could you modify it?

Okay, so we're going to highlight, in this short presentation, three different strategies for this, as teachers, to promote thinking through the tasks and the way we structure our teaching, whether it be around core content areas, helping students there, or the expanded core curriculum. And in particular, we're focusing on the idea of developing tactile graphic reading skills.

So here on slide nine, we have presented strategy number one, "Opportunities to Compare and Contrast." The more that they get a chance to analyze and compare same and difference and look at things that are salient-- salient meaning typical to that particular category will be very helpful for graphs in particular. So what are the salient features of a bar graph? Well, they all have bars, obviously. They all have x,y-axes, they have some kind of labels and titles and sometimes have a key, but not always.

So the more the students know the pieces and parts and they can compare and contrast, the better able, when they get a bar graph that looks slightly different, they'll be able to deal with that. So some ways to do this and to offer these opportunities is to categorize on different features, and I'm going to show you a video that is like a younger level that can help develop flexible thinking.

Try different strategies and then have evaluation of which was more effective. Examples specifically for graphics might be comparing one bar graph to another, what is the same or

salient feature as I mentioned before, or make a group of graphics that students explore to figure out why they were grouped together. So I could maybe put several graphics together that aren't the same type but they all have some similar feature. They all have a key. They all have x and y-axes.

So the student's exploring these and looking to see where those similarities are. You can also talk about differences. And then try different techniques for exploring the graphic. Okay, so I'm going to show you this video and this video is sorting and making categories based on a tray of different shapes. And I could have gone about this with just asking Rebecca to make certain categories. For example, let's say, make a category with all the yellow shapes. She had low vision. Make a category with all the circles. But instead, you'll see in the video, we flip it and we open it up more in terms of having her think about grouping and making categories, and then me making categories and having her try to figure out what it was based on.

DR. KIM ZEBEHAZY: So Rebecca, we're going to do a game where we make different groups, OK?

REBECCA: Oh, fun!

DR. KIM ZEBEHAZY: Alright, so I would like you to use those shapes in the, in the tray and make me a group, please.

REBECCA: A group?

DR. KIM ZEBEHAZY: Mm-hmm.

REBECCA: Okay.

DR. KIM ZEBEHAZY: Something that makes sense to you. Make a group.

Okay, tell me about your group.

REBECCA: These are all cubes. They are in different colors, but they are all cubes.

DR. KIM ZEBEHAZY: Okay, so you're sorting based on cubes.

REBECCA: Yes, the shapes.

DR. KIM ZEBEHAZY: Okay, so I'm going to come into your cube section here, and I'm going to remove these four, and I'm making a new group, saying that these no longer belong. So what's the new thing we're sorting on? These being these guys.

REBECCA: Like the, the these ones have holes in them and they're more of a smoother.

DR. KIM ZEBEHAZY: Okay.

REBECCA: Like a different texture.

DR. KIM ZEBEHAZY: So it could be one or the other, right? It could be cubes with holes and/or cubes with more translucent maybe color.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Okay. Good. Alright, make me a different group.

REBECCA: Okay.

DR. KIM ZEBEHAZY: I'm guessing you made a group based on color.

REBECCA: Yes. All blues.

DR. KIM ZEBEHAZY: All blues.

REBECCA: I didn't do this one, though, because it's not the same.

DR. KIM ZEBEHAZY: OK, so you excluded that one. So you made a definition of the blue you were looking for.

REBECCA: Mm-hmm.

DR. KIM ZEBEHAZY: Good. Could you use those shapes in there now and make another group that makes sense? Taking out something that doesn't fit the new group?

REBECCA: Now they're all just round shapes.

DR. KIM ZEBEHAZY: Okay. Good. All rounded. And now with those, can you make another group? Okay. Very good, and that's just circles, like 2D, right? More flat, right? Alright. Excellent. Okay, we'll do one more and I'm going to make a group, I want you to tell me what you think. I made my group on, Okay?

REBECCA: Okay.

DR. KIM ZEBEHAZY: I've got to think about what I want to do. Alright. I'm going to put these in my group, but not those. What do you think I used as my group criteria?

REBECCA: I think you used smaller circles. There are still, like they're kind of still different sizes, but they're not quite as big as these ones.

DR. KIM ZEBEHAZY: Yes, very good!

Alright, so in that shape sort example here on slide 10, we practice flexible thinking so I had Rebecca make a category, and then based on what was in there, make a different category by

taking some shapes out that no longer fit that particular category. And we practice compare and contrasting skills, and she had to analyze and make a plan versus just being asked to make groups based on a feature.

Strategy two is suggesting that we open up our directive teaching by asking more questions and providing, even if it's a quite directive lesson, because a student needs to learn a particular skill or procedure, that we still provide and build in opportunities for more, more open-ended discussion and exploration on the part of the students.

So directive teaching has its place. It teaches a rote process or procedure. It provides lots of practice in a way that the students aren't making mistakes because they just follow a set of instructions over and over, and the students are working on following those directions.

However, if we open up those opportunities and have more open-ended opportunities, as well, we're providing insight into the student's thinking. We get to see more about how the student's thinking about something and where maybe their thinking is going wrong or where they're really getting it and other things are not quite as clear. It also provides the student more ownership of the task to the student. So, for example, when we talked about self-regulated learning, this is what we want the student ultimately to be able to do is take ownership of their learning and have the skills and the thinking ability to do that. And then it also gives them additional opportunities to analyze, brainstorm, compare, et cetera.

So we're going to look at two different videos. The first video you're going to see here is me introducing Rebecca to a story. And in the story, there's a tactile picture. So in the first one I'm being directive about telling her about the picture and having her explore the picture. So we'll watch that one first. We'll talk about it, and then I'll show you the same thing, more open-ended.

DR. KIM ZEBEHAZY: Rebecca?

REBECCA: Hello.

DR. KIM ZEBEHAZY: We're going to read a book about going on a bear hunt. Alright. I'm going to read to you and then we're going explore the pictures together. Sound good?

REBECCA: Sounds good.

DR. KIM ZEBEHAZY: Okay. "It's here. Today is the day. I'm going on a bear hunt. Ready? Open the door. Creeeeak. Okay, let's go." Okay, on your right-hand side there's a picture. Find the picture. And if you put both hands on the page, the very top, you're going to find a triangle shape. That's the roof of the house. And then underneath the triangle is a square. Can you outline the square? Good job. That's the base of the house. So the roof and then the main part. And then there's that flap there.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: That is the door.

REBECCA: Oh, that's cool.

DR. KIM ZEBEHAZY: Okay, yeah, so let's go ahead and flip the page. So as you saw in that example of video, there's nothing inherently wrong with it. The student explored the picture. She found the different pieces of the house. I asked a few questions, but ultimately I was pointing everything out rather than asking her or having her make any kind of connection. So I, you know, directed her to the top and said well, that's the roof. That triangle's the roof. Yeah, so the student followed directions. She got that practice. She practiced exploring the tactile picture, so that was good, and she had the opportunity to correct her technique because we saw what she was doing and gave her a suggestion.

However, we can take this opportunity and make it even richer, and really help her have more opportunities for thinking and taking some direction of her own by doing it slightly differently. So watch this same picture in this next video.

DR. KIM ZEBEHAZY: Hi, Rebecca. You ready to read a book?

REBECCA: Yes.

DR. KIM ZEBEHAZY: Alright. This is "Going on a Bear Hunt." "It's here! Today is the day. We're going on a bear hunt. Ready? Open the door. Creeeak! Okay, let's go." Let's explore the picture that's on the right-hand side of the page. There you go. Can you tell me what you think you might see in this picture based on what I read?

REBECCA: Maybe a door opening, because I remember it said creak.

DR. KIM ZEBEHAZY: Okay, so you may have a door. Why don't you explore? Is there a door on that page? See if you can find the door.

REBECCA: Oh, yeah, I found something that goes open.

DR. KIM ZEBEHAZY: Yeah, and what makes you think that's the door?

REBECCA: Because it flips open and out and there's something that attaches to it, like-...

DR. KIM ZEBEHAZY: Okay. Yeah. And so what would the door be? What's the rest of the picture, do you think? The door is--

REBECCA: It might be attached to a house.

DR. KIM ZEBEHAZY: Okay.

REBECCA: This is, I can feel that this is the roof.

DR. KIM ZEBEHAZY: Mm-hmm. Good job. Now what is that little thing, that tabby thing, do you think? This is going to, we're going to find this throughout the book. What do you think that's representing, or what do you think that's--

REBECCA: Maybe the sound it's supposed to make? Or--

DR. KIM ZEBEHAZY: Could be. Let's flip the next page. So remember, it says, go out the door.

REBECCA: Yes.

DR. KIM ZEBEHAZY: So let's look at the next page and see what it says. "Uh-oh! Tall, waving grass. Can't go over it, can't go under it, gotta go through it. Swish, swish, swish, swish. Stop. See any bears? No sir. Okay, let's go." Okay, so what's on that page, do you think?

REBECCA: Oh, I think it is the grass because it just talked about it in the book.

DR. KIM ZEBEHAZY: Okay, good. Yeah, here's the grass. And we're going on a bear hunt, so what do you think that tab is? You see this tab again, right?

REBECCA: Maybe it's the human.

DR. KIM ZEBEHAZY: Yeah.

REBECCA: The person walking through it.

DR. KIM ZEBEHAZY: Right, so you just made him go through it. So if we went back to that other page, can you make him come out the door? There he is. Out the door. And then he goes to the next page.

REBECCA: Oh, yeah.

DR. KIM ZEBEHAZY: All right. What do you think, what do you think is going to happen next? What do you think?

REBECCA: Maybe they're going to find the bear?

DR. KIM ZEBEHAZY: Alright. Let's try.

So as you saw in that video, it was more open. The questions were given to the student an opportunity to predict and make connections. It provided insight to the teacher. So before telling the student what it was there, we were able to see if the student was able to make connection, for example, between the text and the picture, and to see what they could do on their own. For example, figuring out that there's probably a door, and which was the door. It allowed me to ask, well, how did you know that was a door? To see what their thinking was. What is it that was salient for them to know that that was the door?

Because it could be for different students different things, and if we don't ask, we're often guessing, and we might be wrong. Some questions that relate to being able to get at this would be, "Check this out. What do you notice? How do you figure that out?" And. "What would you expect to find?" and "Why?"

This provides opportunities to give feedback on strategies used, as well. So we gave some feedback in that original video, but here we're not just observing what we think the student's doing and why, but we also get the feedback based on what they're telling us, and in, in the way that they're going about exploring.

Okay, let's talk about our final strategy here on slide 14. The strategy three is "Think Aloud." Think aloud is a procedure just as it states. It's just having the student talk out loud what they're thinking and doing while they're doing it. It can also be retroactive, and you'll see in the video that I show you that since this was a new thing for Rebecca to do with me, I did some scaffolding and asked her after she did things, what did she do and kind of promoted that idea of think aloud when she fell silent.

You could do this in two different ways. You can do a teacher think aloud, and this is a great way to model metacognition, your own strategic action cycle, and model learning is a process that, with mistakes being part of it, that we all make mistakes, and that's how we learn. And the more we can focus our feedback on the process, the more successful students are going to feel, because particularly for students who struggle and don't necessarily come to the right answers, per se, we can find things that they are doing in their process that we can then develop further to help them succeed.

And the student think aloud will draw the students' attention to their own process as they're talking out loud. It'll give you a sense if they're able to do that level of articulation or what amount of work you might need to do to help them get to that point, and it provides additional insight to you in other ways, in terms of what might be going wrong. And we'll see one in particular, for example, that we'll see in the video with Rebecca.

DR. KIM ZEBEHAZY: Hi, Rebecca.

REBECCA: Hello.

DR. KIM ZEBEHAZY: We are going to take a look at a bar graph. I know you've been practicing these in class, so we're going to practice some of your strategies and skills for reading bar graphs, so when you get back into class, you can have your strategies ready to go. Sound good?

REBECCA: Sounds good.

DR. KIM ZEBEHAZY: And in order for me to kind of understand what you know really well and what we might want to work on, I want you to do what we call a think aloud.

REBECCA: Okay.

DR. KIM ZEBEHAZY: What do you think that means, think aloud?

REBECCA: Whatever I'm thinking, like, share it out loud and then explain it as I'm thinking about it?

DR. KIM ZEBEHAZY: Yeah, exactly. So it can be kind of hard to do initially, but give it a try. So as you're feeling around and exploring, and then I'll ask you some questions about the bar graph, you tell me what you're doing and why, why you're doing it and what you're noticing.

REBECCA: Okay.

DR. KIM ZEBEHAZY: Okay? Alright, so why don't you just go ahead and explore the page and tell me, tell me what you're finding.

REBECCA: This feels different than this one. This is softer. This one's more rough. Must be the legend. They could be separated into, into two different groups.

DR. KIM ZEBEHAZY: Okay.

REBECCA: This one feels like this one, so they must be in the same category. And these two feel the same, also.

DR. KIM ZEBEHAZY: Are you ready for some questions?

REBECCA: Sure.

DR. KIM ZEBEHAZY: Okay. so think aloud again, please, while you do the questions. How many bars are there?

REBECCA: How many bars?

DR. KIM ZEBEHAZY: In this bar graph. How many bars does this have?

REBECCA: One, two.

DR. KIM ZEBEHAZY: Mm-hmm.

REBECCA: Three, four. I don't think that's anything right there.

DR. KIM ZEBEHAZY: Yeah, you're right.

REBECCA: Four. Is there four?

DR. KIM ZEBEHAZY: Yes. And how did you figure that out?

REBECCA: I found four different textures, and so like, each one feels a bit different, a bit different.

DR. KIM ZEBEHAZY: Did you do something specific with your hands when you're doing that? Did you?

REBECCA: I moved side-to-side and went up and down and then felt around it.

DR. KIM ZEBEHAZY: Okay. Just like, tried to verify that actually was a bar when you found it to make sure?

REBECCA: And like, I compared it to others to make sure that it was, yeah, it was a bar.

DR. KIM ZEBEHAZY: Okay. Good. Yep. Great. What is the category of the highest bar?

REBECCA: I think this is pop.

DR. KIM ZEBEHAZY: Yep, that's the pop category, and that bar from the legend, how do you figure that out? Age 10 and age--

REBECCA: Is that age 10 and 11?

DR. KIM ZEBEHAZY: Yep, so that one was age 11.

REBECCA: Yes.

DR. KIM ZEBEHAZY: Okay, good. Which, which age group liked rap and hip hop more? Remember, tell me what you're going to do. What's your plan?

REBECCA: I'm going to look for-- so this one must be-- this is younger age?

DR. KIM ZEBEHAZY: Yes.

REBECCA: This is 12 and-- the younger one's 10, and then-- 10-11 so 12-13?

DR. KIM ZEBEHAZY: Nope. The younger one's 10 and then that one's 11. Just two ages.

REBECCA: Oh, Okay. So I'll look for the same feeling. Sorry, can you ask me the question one more time?

DR. KIM ZEBEHAZY: Which age group, age 10 or age 11, liked rap and hip hop more?

REBECCA: Okay, so this is age 10. This is age 10 and this one's-- this one's age 11, so which one's higher? Age 11, age 11 liked rap and hip-hop more.

DR. KIM ZEBEHAZY: Okay. What can you do to double check to make sure?

REBECCA: Oh, feel the..oh, age 10 liked hip-hop more.

DR. KIM ZEBEHAZY: Yeah, very good. So what did you do altogether? So you, first you did what?

REBECCA: I felt at the legend and tried to see what it was, and then went, went down here and where the bar graph was and tried to feel the same thing.

DR. KIM ZEBEHAZY: Okay. And how'd you know you were at rap and hip-hop?

REBECCA: Because I read the braille.

DR. KIM ZEBEHAZY: Yeah. Okay, so you read the category, right, and made the comparison. Great. Alright. Let's practice think aloud one more time and I'll ask you which music was the favorite for age 11?

REBECCA: So this one's age 11, the fuzzy one. Which, which?--

DR. KIM ZEBEHAZY: Which music type was the favorite?

REBECCA: Okay. Age 11. This is age 11. Where's the other? This one feels lower, because if I try and do that, this one's lower.

DR. KIM ZEBEHAZY: Okay.

REBECCA: Pop was more popular.

DR. KIM ZEBEHAZY: Very good. Okay, so tell me how you think you did.

REBECCA: I think I did Okay.

DR. KIM ZEBEHAZY: Yeah? What was the hardest part?

REBECCA: Going back to the legend and like, reviewing it, and make sure it was, making sure it was right.

DR. KIM ZEBEHAZY: Okay. And what part was easiest for you in terms of figuring out what was in that bar graph?

REBECCA: Well, actually, I think the legend helped me. I guess, so yeah, I would choose that for, that was the easiest part, and the hardest part-- the, like going back from, going back and forth, and it kind of made me not organized and I kind of lost my place.

DR. KIM ZEBEHAZY: Okay, so what would we do to try to, to keep track of things?

REBECCA: Keep my finger placed there. Like don't move it.

DR. KIM ZEBEHAZY: Okay, so if you go back up to the legend, right, you might keep your finger where you left off in the bar graph?

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Which you did. I was observing. You were doing that a little bit, so that was good.

REBECCA: Okay. Thank you.

DR. KIM ZEBEHAZY: One thing I noticed is that you had a little trouble staying on the y-axis.

REBECCA: Yeah, I did.

DR. KIM ZEBEHAZY: Yeah, so what can we do to practice that, do you think?

REBECCA: Start from the x and then try and meet it?

DR. KIM ZEBEHAZY: Yeah, so we've kind of learned a strategy if we maybe start at that corner.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: I'm very focused. I'm trying to stay on the line. It can be hard. Sometimes the lines are hard to stay on.

REBECCA: Yeah.

DR. KIM ZEBEHAZY: Alright. You're well on your way to using bar graphs in class.

REBECCA: Thank you.

DR. KIM ZEBEHAZY: Okay, so you saw two clips of a longer clip of Rebecca doing a think aloud, and one thing that we did notice in that think aloud was that she was struggling with the guidelines of the bar graph, one of the bars in the guidelines of the bar graph. So she thought she was on a bar and she was saying it was the same texture as the bar in the key.

And we may not have realized that had she not been doing the think aloud. So that gave us a little bit of extra perspective that we might need to work on her tactual discrimination skills a little bit more and help her distinguish between those guidelines for moving across to read the y-axis from the actual bars themselves, and maybe do some more practice in that.

Some of the things that we asked that can promote the student doing more spontaneous think aloud over time are things like, "What did you do to figure that out? What's your plan? What can you do to make sure?" So helping students learn about self-checking is very important with tactile graphics often. And, "Why did you select that strategy?"

So in wrap-up here, some tips for improving questioning and students' thinking skills include record yourself teaching a student. I've done this. It's fascinating. You'll learn a lot about yourself and the things that you do in your teaching that you may not be aware of, and it'll help you see whether or not you are already naturally infusing these opportunities to work on thinking, work on self-regulated learning and the strategic action cycle, or if you need to do a little bit more preplanning and be more deliberate with it.

Again, the more we expect students to do this over time, the more they're going to get better at talking and giving those answers and being able to answer those hows and whys. Even if they're not able to do it now, if we don't give them the opportunities to try, and we don't show that we expect that they can do that, even if we have to scaffold them to get to that point, they're never going to develop it if we don't give them the opportunities.

Preplanning some higher-level questions for your lesson can help, or having those how or why generic kind of questions ready, or a routine that you go through that allows that practice can be helpful to make sure you get some of this in your lessons. Ask how and why often. Provide frequent opportunities to engage in the whole strategic action process, and then focus on the process versus the outcome with your feedback.

So, there's lots more that goes into developing thinking skills, but I tried to highlight three main strategies to get us all started, and just to get us thinking. Get it back in the forefronts of our brain. We know about these things. We know these things are important, and now just us taking steps when we're working with tactile graphics or other content area to really make sure we're incorporating these opportunities for our students. Thanks for listening and keep those students thinking. Bye.