>> Thank you very much! Good afternoon, everybody.

>> Good afternoon.

>> How are you doing?

>> Good.

>> We are on TV! Well, video, I guess I should say. So if I walk next to you and you hide your face, or whatever, I understand, but I'll stand there until you uncover your face, so that'll, you know, we'll make sure that gets going. All right, so well, it's good to be here, good to see everybody. Come on in, come find a place. It's all right. [SINGS] Dry whiskey, dry whiskey, dry whiskey -- this is -- I'm doing this so you can sit down. You know, [SINGS] Rye whiskey, rye whiskey, rye whiskey I cry... Anybody know this song? [SINGS] If I don't get rye whiskey, I surely will die! Hurry up and sit. [SINGS] If the ocean were whiskey and I was a duck, I'd swim to the bottom and I'd drink it all up! And you can add your own favorite beverage, okay? Iced tea -- [SINGS] Iced tea, iced tea, iced tea I cry -- or, cold beer. [SINGS] Cold beer, oh cold -- see this is for you all, but nobody's joining in, so we'll stop, okay? Whatever.

All right, glad I could do a little intermission. Okay. So, thanks for being here. It's good to be here in Pennsylvania. I'm from Tampa, Florida, originally from Ocala. Anybody know where Ocala or Tampa is? Ocala. Anybody know where Tampa is? Ha ha ha ha ha -- okay. It's not this cold in Tampa, I'll just let you know, and it's green and not white. But it's nice to come up here and see the whiteness. Really good, yeah. I know you're all about tired of it, because it's been a while, and yet 30-something inches most of you all, I guess? Yeah? Okay. Well, good luck with all of that. I'll be leaving tomorrow.

So today we're going to talk about the importance of teaching students with disabilities and other struggling learners to be strategic in their approach to mathematics. One of the things that we see a lot when, particularly kids who are struggling, is the focus gets narrowed. And we go away from trying to actually help kids become mathematical thinkers to be -- to them getting things correct, right? And a lot of times it ends up really focusing on computation, and kind of procedural math. So while computation fluency and procedural fluency are important, what undergirds that is being able to be strategic as a problem solver. So we're going to talk a bit about that today. And so that's going to be the focus of our discussion.

All right, you know what? So this is not being strategic, is to realize this is a command module that has to be turned on. And once it's turned on, voila -- something happens! Good! All right, so this is kind of our agenda. I want to say off the bat you have ha handout, and I want to just quickly introduce you to what that handout has in it so that you kind of can follow and know what's there. There are some slides that I had blown up, okay, that follow what we're doing, and they kind of follow in order. You also have the PowerPoint slides on the other handout. So I just want to acquaint you to some of the things that I thought might be important for you to keep are there. I also have examples of some of the different practices and tools that we'll talk about in relationship to teaching kids to be strategic in their approach to math. So just so you know, that's for you to have and to use as a resource. And of course, the other handout is really about the slides, so you can follow along and write whatever notes you want to. Okay?

All right, so we're going to begin talking a little bit about what does it mean to be strategic in our approach to mathematics? What is the connection between mathematics and metacognition? Getting a little idea what it's like for kids who struggle to learn mathematics, who have metacognitive awareness

deficit, and what it's like so that you had to get a sense of if we're going to intervene, what we need to be thinking about. We'll talk about three specific disability-related characteristics that can impact metacognition for kids with disabilities, and then we'll discuss a frame for thinking about instruction, and then talking about some specific examples of instructional practices. And then of course we'll have some time at the end for questions and discussion; I really want to save some time because, you know, I want you to have an opportunity to at least talk about, make comments about what you're learning, insights and questions that you have. So we'll try to hold off about 15 minutes at the end for that, okay?

All right. So everybody good? Really? Okay, great. So you know the Olympics are coming up. Nobody's excited about the Olympics? Man alive, I'll tell you! Well, they're in Brazil. We've got some nice water down there, I understand. So, you know, the Olympics, they all have mascots in the countries, you know, all common, and at one point in time -- you all didn't know this, I guess -- is that there actually was a competition where they were going to develop mascot names for each country's set of teams that were coming to the Olympics, and that kind of phased out, didn't quite get there. But I just got some examples to share with you. So one on the list was the Brussels Sprouts, the Cans Openers, the Amsterdam Yankees [LAUGHS] -- the Amsterdam Yankees? Yep, the Vienna Sausages. Come on, what's up with that? This is metacognition, guys, okay? You know, you understood -- the Belgian Waffles. [LAUGHS] Can't say that one. All right. The Buenos Airheads -- Buenos Aires, Airheads? Okie dokey. The Hungary Jacks -- Hungry Jacks -- I guess this is why they didn't quite make it in the Olympics. So I'll do the last one, which is the Prague-tologist! [LAUGHTER] Yep, that's what you get when you come and see me! Good stuff. Good stuff. All right.

So let's move on, since that didn't work out too good, and talk about -- let's introduce you to myself, introduce myself to you so you kind of know who I am a little bit. So personally, I'm a native Floridian, I was born and raised in Ocala, Florida. Ocala is a kind of a big horse country like Lexington, it's kind of the next place where people go to buy and sell and breed horses. My wife is Margaret, and I have three kids. So let me show you my kids, Gracie, Mona and Tally. That's Mona. That is Gracie, she likes to watch sports with dad in the den, so we do that. And that's Tally, and he likes to curl up on his bed. And he goes wherever I go. So that's my family, all right? Professionally, I was a middle school teacher, as Jerry mentioned. I was a faculty member at JMU, as well as USF. I teach at both undergraduate and graduate levels, and do research focusing on instructional methods, particularly mathematics and also in teacher education, so how do we better learn about preparing teachers to be effective at what they do? Some of my favorites, my favorite color is blue, my favorite person is my wife. How many husbands are here? Okay, remember, that is the right answer, so you know, all right? But I'm just -- she really is. My favorite animals are dogs and horses. I grew up riding horses in Ocala, my mom taught riding. We had horses, we had a little Green Acres farm, and wonderful animals. They do a lot -- they poop a lot, just to let you know. My favorite author is Robert Grisham, just starting his last, his most recent novel, Gray Mountain, so far so good, I'm in the third chapter. Favorite mascot -- Florida gator, what can I say? So just remember -- oh my gosh, I did it again. Okay, camera person, I'm going to have to do this, because I messed up.

>> Hit the top button on your remote. Or the bottom button, one or the other. It didn't help?

>> Yeah, I got a new one. And I don't know how to work it, so that's a problem, which is -- I couldn't work it last session, and I can't work it this session. This. Come on! Sorry -- I know what I did. I hit the pointer thing. Okay, go back over here, so I can -- I'm not a dark blob. Food -- steak and pasta, music -- most anything that's done well. Favorite singer/performer, Jimmy Buffet. Any parrot heads in here? Parrot heads? Yeah? Very good. Okay, I like Zac Brown a little bit, too, and of course my career has

been as an educator. Some people would dismiss that as a fact, but I've done the best I can, all right? All right.

So what does it really mean to be strategic in one's approach to learning? Number one, you've got to be active. So if I am metacognitively aware, I am actively thinking, okay, and I am actively thinking about what I can do to learn. In order to be metacognitively aware in mathematics, I have to be willing to take risks. Too oftentimes our kids don't want to take risks because they're afraid of failing, not getting the right answer, right? And so taking risk, and risk-taking, is an important component of being strategic in one's approach to mathematics. So here's a little quote, and it's by Michael Porter. And I think it is a very, very important quote, and this important concept is that if we are going to help kids become strategic, we as teachers and educators have to be purposefully committed to teaching kids to be strategic, and that is, we have to have this in a mindset that this is something that kids with disabilities and other struggling learners can engage in, and it's going to be a part of a focus that we have in our math instruction, in our curricula. Second, a strategy without tactics is the lowest route to victory. Tactics without strategy is the noise before defeat. Sun Tzu. Second major point, that students with disabilities need to know the strategy, but they also have to be equipped with the tools in order to implement the strategies successfully, right? We can post stuff on the wall and we've got a nice little acronym going on. But if kids aren't equipped to implement that strategy when it's important to do so, and do it effectively, then it's not worth much of anything. However beautiful the strategy, you should occasionally look at the results. So students with disabilities need to be able to self-monitor the success of the strategies that they're learning, okay? So self-monitoring and self-regulation is part and parcel for being effective.

There is nothing so useless as doing efficiently that which should not be done at all. And if you can't see the first picture up here, what it says, it says, "Special Education still funded at only 19 percent, 18 percent." For those of you who know, we've been underfunded forever. And then of course the second one is, "I promise full funding special education," kind of this empty rhetoric. We can do something efficient, but if it's not effective, it's not useful.

So no matter how well a strategy is utilized, if it's a bad strategy, don't teach it, and we don't need to use it. Okay? One of the things that I've learned very well from my math ed colleagues is that sometimes we develop strategies that actually aren't accurate in relationship to the mathematics that we're hoping the strategy is going to help kids be able to accomplish, or what they're going to be able to learn and generalize to in the future. And so we have to be conscious to the relative significance of the strategy, and what it's really used for, and we have to have ways to be able to help kids generalize from that to other more efficient strategies.

So this is a little Far Side -- dang, look at the time, and I've got to be in little Billy Harrison's closet before nightfall. I used to love Far Side, I was so sad when he left us. But, so what does this have to do -- well, being strategic is also being confident. And I talked a little bit earlier, mentioned earlier, that risk-taking is a major and important aspect to being strategic. And so we have to make sure that -- I'm sorry -- we have to make sure that we are helping kids develop confident. And not fake confidence, but real confidence, about that mathematics is about a sense of purpose, and it's about trying and using my brain in strategies, and that it's okay if I don't necessary get the right answer the first time or the second time, that it's in the trying and in the development that I'm developing an awareness of mathematics that I wouldn't have if I didn't before -- if I didn't do that.

Okay. So why is it important? I've bolded a few words here; kids with disabilities often times are passive in their approach to learning generally, but also in particular learning mathematics. And so when we have a purpose of teaching kids to be strategic, we are beginning to help them see that, guess what, if I sit in a chair, that knowledge is not going to just necessarily drop in my head. There have been interviews with kids who struggle, and their perceptions of kids who are, quote, "good students." And their reaction is that, well, they're just good at it, as if I can't be good at it; that it's a natural thing for these people and not a natural thing for me. And so, why should I try, because I'm not that person. So we have to remember that that is a very deep-grained characteristic that many kids have in relationship to how they approach learning. They also don't apply strategies to learning oftentimes, or they stay with the same strategy that's been unsuccessful because they know they can do it, and they know the outcome. I don't have to take a risk, I know what the outcome's going to be, but I did something, right? And of course, they're reticent to take risks. This all sets kids up for failures when they are in situations in math that call for real problem-solving and reasoning, as opposed to rote recall, okay, and memorizing procedures.

So the nugget here is, struggling learners can become strategic learners when teaching them to become strategic in their approach to math is a priority. So I've said this in about 15 different ways already, and that is, if we are going to help kids become strategic, it has to be a priority of us. And I mean "us" as individual teachers, "us" as grade-level teams, department teams, "us" as problem-solving teams, "us" as building level administration teams. It has to be a priority if we're going to make this happen for kids who are struggling.

So in summary, students who are strategic in their approach to learning, they effectively use strategies. They effectively monitor whether the strategies they're using are effective, okay? And if they're not effective, they try something different, okay? So they monitor the success of their strategies. They also make explicit connections among mathematical concepts. And then they possess a sense of confidence and purpose around problem-solving. So those are some key characteristics of students who are strategic in their approach to learning. So if you think about kids that you work with, or kids that you're concerned about, and you look at those four characteristics, think to yourself, does that student, or do those students, exhibit all four? Do they exhibit none? Do they exhibit some, or do they exhibit some partially, but not all the way, because I think one of the things we have to recognize is that yeah, it's true that a lot of kids who struggle are not strategic. But they're not all the same. And they are -- they have strengths in different areas that may relate to some of these characteristics, but they also may have areas that aren't strengths. And we have to begin to have a way, conceptually, to think about, well, where is this student in relationship to engaging in these things? And one student may have a little bit different profile on these four characteristics than another student might have. But again, it's a way for us to start thinking about, well, where do we start intervening, and why? And what kind of instructional practices might we use?

So a big idea here is that we can help kids become more strategic, if we focus on teaching metacognition that is helping kids become more metacognitively aware, and teach self-regulation. Those of you who are in special ed, most all of you are, if not all of you, you know that self-regulation just generally is an important aspect to becoming an independent person, right? And then we can start seeing how it develops in different content areas. And I may be more self-regulated in areas that I'm more successful with, and less self-regulated in areas that I'm not, right? So again, these are two important things, big concepts to think about, as it relates to this idea of kids who are strategic. So again, emphasizing that we as teachers, as educators, have to make this a priority if we're going to. And if we do, then metacognitive awareness and self-regulation can equal mathematical success, which can equal

confidence and purpose, which is really what we're trying to get at when we're doing this with relationship to our kids who are struggling. Okay.

So, take a little sip here. This is my little icon for metacognitive awareness, this is a little frog, he's got a little bow tie on, it's a nice bow tie, it's purple. And he's thinking about himself thinking, right? So again, that's kind of an icon for us thinking about this. So what's the deal with mathematics and metacognition? Thank you very much, I appreciate that. A little bit of laughter. But if you read that, the first time I saw this, I was, like, what? And then I went, oh, oh! Oh, no, that can't be right, you know, it was like that kind of thing. So I had to use my metacognition a little bit to make sense of that statement, okay? I think it's kind of fun. You know, because sponges soak up water. There's a lot of sponges in the ocean -- that could be the reason we -- it might not be climate change, it may be the sponges -- we've got more sponges! Somebody work on that. We'll get a science -- get Jed out there, we'll figure that out. Yeah, okay, we're good. All right.

All right. So yes, metacognition is thinking about your thinking. So if you think about mathematics, so much of mathematics is about thinking, reasoning, right? And so employing problem-solving strategies, and being okay with, hey, you know what? The first time I tried this strategy it didn't quite work, I've got another one I can try, and beginning to make connections between when one strategy seems to work better than another one, given the context, right? Changing strategies when needed, making connections, and then seeing structure in relationships. So much of number sense and understanding number is about seeing structure and seeing relationships. And there's been some work recently that suggests that if we concentrate, particularly in the elementary and middle school grades, if we concentrate a lot of our efforts on number sense-making, we can make a lot of progress in terms of our kids beginning to be able to think numerically and strategically when it comes to numbers, and I think that's important. So this idea of seeing structure in relationships is important.

Okay. So all of you, I know, are aware of the Common Core standards, I am sure within the Pennsylvania standards, you also are -- there is an emphasis on the mathematical practices that have come from the Common Core. And by the way, those -- the Common Core and the practices within them really arise from quite a bit of research that has been done around not only other countries who are -- whose students are performing much better, much more proficiently in mathematics, but also doing a better job of starting to try and coalesce or research across math education, mathematics and special education. And so these mathematical practices kind of are an important aspect of that research. And part of these practices, or all of these practices, there is a metacognitive strategic aspect to each of them, okay?

When I first was confronted with answering questions about the mathematical practices and students with disabilities, many of the questions were not, "how do we," but, "we can't," in the sense that students with disabilities can't do this stuff, okay? Or, struggling learners who aren't identified with disabilities can't do this stuff, right? And what that does is, again, it puts kids into this box where, all right, let's pull out the old worksheets, okay, and let's do computations. Let's do computations, let's do computations, and we'll put them on Istation, we'll put them on i-Ready, or whatever the thing is, and we'll figure out how many they get right that time, and we'll move it again, we'll do it again, and we'll do it again. Okay, computation is great, it's very important; learning to compute, learning to use algorithms efficiently -- important. I don't want to dismiss those. However, what I also want to say is that if we don't open our window of view for what students with disabilities can do in mathematics, they are not going to reach a better point. The NAEP data, National Assessment of Educational Progress, which is an indices of how students in fourth grade, eighth grade, and in certain high school content areas how they

perform based on their state assessments. Students with disabilities have been the lowest, performed the lowest or next-lowest every year since this has begun. And their scores aren't improving. So what we've been doing hasn't been working, and we need to understand that we've got to have higher expectations about what we can do with kids when it comes to mathematics.

Okay. So we're going to take a test, okay? And what I want you to do is pull out a piece of paper, or you can use the back of one -- no, I need you, if you can, get a clean piece of paper, because I need to pick these up. And if any of you attended the last session, we will be doing the same thing as we did with the last session; that is, we're going to pick them up. We are collating the data, so we'll find out how well you did. I want you to put your name, your school name and your district on the right hand corner, so we can then aggregate the data and then disaggregate it so we can look holistically how people are doing, but also by district and school. We do this -- there's a number of us who have been asked by different state departments to do this, to give a sense of the effectiveness of teachers in mathematics, so this is going to be the Mathematics Effectiveness Teacher Test, okay? All right, you're going to have one minute, okay, to take this test. All right? You ready? You got something to write with, okay? All right? Set, go.

Oh, man! God, wait! Everything's missing up, with that dab-burned thing. I'm going back. You all didn't see anything, okay? All right, get you going, you've got a minute. Here we go. [MUSIC PLAYS] All right, let's go! One minute, one minute, one minute, one minute! All right, get it pumping, get it pumping, get it pumping, let's go! We can do well, we can do good, let's go, let's go! You've got to sit down in order to take the test, come on, let's go! Where we going? Let's go, all right, let's go. Come on, let's get along. Let's go. Come on, okay, let's go, let's go! Come on, oh, here we go! Here we go! Get going! Come on, let's go! Let's go! All right, getting along, all right. She's got about 20 of them done, over here! Man! All right, hold on a second, I just noticed something. Did you all read the directions? If you had, you might have noticed that for the set of problems you have, the addition sign means multiplication, okay, the subtraction sign means division. The multiplication sign means subtraction and the division sign means addition. All right, so I'm going to give you another chance, okay? Because you obviously are not -- you're kind of passive in your approach to learning, so let's -- all right, you ready? All right, let's do it again. Okay, go!

All right, here we go, let's go. Whoo, whoo, whoo! Come on, pump it up, babies! Come on, let's go, let's go, let's go! All right, let's go, come on, let's go! Let's go, let's go! How are you doing down here? Are you talking? This is an individual test, let's go. Come on, let's go. What we doing? Let's go. This is for money. This is going to be a grade for your school and district, come on! Let's go!

>> I can't read it!

>> What do you mean, you can't read it? I don't think so!

>> The directions. I can't see the directions.

>> All right, we've got 15 seconds! Fourteen, thirteen, twelve, eleven, ten -- come on, get every last answer counts! Nine, eight, seven, six -- at least if you tried, you get credit. Four, three, two, one, bah! Okay, now, so what I want you to do is, I want you to take a look at your responses, okay, this is the honor system, all right, and I want you to count how many you got correct, okay? And I'm getting ready to show you the number of correct -- I mean, what the correct responses are. Okay, so I want you to

grade yourself. When you get that done, I want you to put the total that you got correct in a big circle right underneath your name, okay, and your school and your district.

Okay. So, how many -- there's 40 items. How many got 40 correct? No? Okay. All right, how many got at least 30 correct? We'll give you a little break. By the way, I don't know if I told you, but we do this with a group in the State of Florida, and they got about 95 percent accuracy on this, so, um... All right, 20? Twenty? I'm really dumbing it down. Geez. This is the Keystone state, is that right? [LAUGHTER] How about at least 10? Okay, we got one that got at least 10. Five? At least five? Oh yeah, okay. All right. Did anybody get -- how about, who got at least one correct? How many got zero? All right. Okay, You know, he's very proud about how he's got -- he's, "Well, I got zero there, yeah, I'm good!" All right.

So obviously, I have played a trick on most of you, if you haven't done this or seen this before, okay? Well, I didn't really play a trick on you, okay, what I've tried to do is simulate what many students with disabilities experience when they're face with a task that, quote, "they were tricked on," or, "they switched the game on," or is different than what they automatically think they're supposed to do, right? What I had given you, you thought was a basic Math Fact retrieval task, when actually it was a problem-solving task. Okay? Now, yeah, I messed up, I messed with the size of the font a little bit, okay, but the reality is that if you were going to be assessed based on your ability to problem solve in this situation, the standard for solving Math Facts for adults is approximately 40 to 80 per minute, right? Okay, so if you think about Math Facts and what you thought, and what you were able to do, and then transposed that to the problems that students have when they're doing more simplistic kinds of things like Math Facts, you begin to understand how they start to feel. So instead of a Math Fact task, it was a problem-solving task.

So let's talk a little bit about this. I want you to think, did you experience any of these things here? Anybody experience learn helplessness? I observed it, okay? All right, so some of you kind of just gave up, right? All right, I'm not doing this anymore, okay, I can't be successful. By the way, I know this guy will eventually tell me the answers and so, you know, whatever, okay? How about, how many of you all took a passive approach to learning, do you think? Okay. You saw, visually, these look like Math Facts, right? Pattern, history. One minute. Do, right, when in actuality if you had -- and I had made the directions a little bit bigger, and you had actually paid attention to them, but I guarantee 75 percent of you would not have, you probably would have had a different outcome, right? At least somewhat. How many of you were a little bit anxious about this? Okay. Did it help me hovering over you? Okay.

>> The noise you made was distracting, when you were walking around the class like that adds the anxiety.

>> Oh, okay. So the tension in the room got a little bit much, because it got to where you probably were a little bit distracted from what you were supposed to do intentionally by me, yes. I mentioned the idea that you thought this was a Math Fact test, but it actually wasn't. Now think about kids who have academic skill gaps, and they think they can do something, but they don't quite have all of the tools to do it. And it becomes very frustrating and difficult for them. Did any of your avoid -- I saw a lot of faces looking the other way, I know that, okay, all right -- when you first -- there was a number, and I'm going to pick on you right in the middle in the back table. You, yeah. Right there, yeah. That's avoidance behavior, looking back this way, yeah. Yeah. So I noticed you had gotten -- you had, I mean, like, 15 or 20 done before I stopped. And when I noticed it, what happened when I pointed out that this was not what you thought it was? How many more did you get done?

>> None.

>> None. Okay, all right -- no way, I'm not doing this anymore, okay, right? So when you start thinking about that experience, and you think about some of the characteristics that are common for kids who struggle, it gives you a little indication about how difficult this can be. Now, let me ask you a question. Did anybody use a strategy? You did. What did you use?

>> I did all the multiplication first.

>> Okay. How many people did that? You chose one operation; you knew what the relationship was, right, and you did all those. Because at least you could get those done, right? All right, did anybody else do that? Yes, yes. Anybody use another strategy? What did you do?

>> I wrote down the directions.

>> You wrote down my directions?

>> That plus means multiply...

>> So you made a little legend, right, to help you figure it out. Did you do the same thing? Or do something different?

>> Eventually, but I just started rewriting with the...

>> With the right -- okay, so you started replacing the actual operation signs within the problems, right? Okay, good. All right. Did any of you think of -- those of you who didn't respond, did any of you actually think of trying something different than what you had already been trying? Probably -- because I saw, if you didn't shut down, didn't quit, most people go back to, okay, I'm going back to the first problem -- okay, what the heck was the multiplication? I don't remember. Okay, oh, next one is addition, I remember that one. I'm going to do that one, right? Now, if you think about that, all of you employed a strategy. Some of what you employed was a passive approach, some of you employed an active approach, right? Some of what you employed was successful, some of what you employed was not so successful, right? So when we start thinking about kids in mathematics, and whether or not they are utilizing strategy in metacognition and self-regulation to perform and to learn, these are the kinds of things you want to start thinking about in relationship to what you're seeing and what you're expecting from kids in mathematics.

Okay. So there are reasons why kids have difficulty in being strategic, or being metacognitably aware in mathematics. And I want to talk with you a little bit about those. There were three specific disability-related characteristics that are very closely-tied to metacognition, okay? So one of the things I want to mention to you is that our brain is complex; it's not really separated into individual components. The brain works in an integrated way, we know that. However, we also know that kids demonstrate certain characteristics that can be -- make being metacognitively aware more difficult. One of those is attention deficit, so attention difficulties. One of those is memory, and one of those is cognitive processing. If you've ever studies information processing, or cognition, you kind of know that these are all kind of interrelated aspects to processing information efficiently, both from inputting information and expressing information. But these three really are ones that are important to think about.

So when you think about attention problems, the arrows represent all the different stimuli that are coming through our sensory pathways, right? During the math test, many of you experience different stimuli, right? And those stimuli, somebody -- I think you mentioned that you got to the point where I couldn't concentrate on this anymore. It's almost like for kids, a firecracker going off in their head. There's so many things going on that it's a matter of filtering, right, in that for many of us, we can filter different stimuli at the same time, and be able to concentrate and react and work with the most important stimuli for the task at hand. For kids who have attention difficulties, this is very difficult for them. So going back to the math test, if you think about the things I was doing in an excessive way that made it difficult for you to filter, and therefore employ strategies and to think through this problem-solving situation, you kind of get a sense of, okay, what it's like for kids in real circumstances where we're not doing anything in an exaggerated way, but very minor stimuli become very impactful for kids who have attention deficits.

All right, so how do you construct the worst possible environment for students with ADHD, okay? Well, the first thing you do is you place them in an environment with linoleum floors, lots of glass, high reverberation, 25 other kids who are whispering, dropping pencils, et cetera. So that's number one. So write this down because it's important for you to remember, okay? Second thing is, make sure that consequences are inconsistent, infrequent and they are delayed, okay? Third, place a premium on self-control, sustained attention for successful performance, and positive strokes. Fourth, provide the high probability that negative behavior will be quickly reinforced, okay? Now, when I first saw this -- I didn't really come up with all of this on my own, it's amazing, isn't it -- I started thinking about myself and my students, and how many times this kind of stuff is going on. And me, as a special educator, I'm not even -- myself not even consciously aware of it sometimes, right? Make sure there is a limited approach for the student for structure and feedback, create tasks that are much less interesting than the surroundings, and place a person in charge who has a little knowledge about the needs of students with ADHD. If you do all those things, then you've just created the average classroom. Now, the reality is that studies have been done where people have gone in an observed. What goes on in classrooms? What is the classroom environment like? And many of the things that you see listed up here are common in most classrooms, yet they are very disadvantageous for kids who have attention difficulties.

Now, this is just a P.S., to maximize the effect, bring the student to school in a big yellow bus with a white top. Now, I don't know if you all -- we have, in Florida, we have all the busses that are for students with disabilities who are receiving transportation services, they used to be short, now they're long, the regular size. But they all have this big white top on the top of the bus so that they can be seen from above if something happens. And so everybody knows it, right, okay. So again -- I didn't do that, I didn't do it! That didn't work. All right. Golly! This is a powerful clicker, that's all I know! Okay, it came back. Yeah, that's amazing.

Okay. So when we think about -- excuse me -- when we think about disability-related characteristics and attention problems, characteristics that affect metacognition, coming to attention, attending to the most important things, sustaining attention, resisting distractions, controlling impulsivity -- the implications for each of those are on the right. So with mathematics, one of the implications is missing key steps or features of a concept or a process. And if I'm trying to be strategic, if I'm missing one or more pieces of the pie, I'm going to have trouble being able to implement a strategy I have with success, right? Responding to questions or prompts prior to considering all of the information, avoiding tasks because it's too tiring to filter -- one of the things that is true about kids with attention deficits, sometimes they are up here on a wire. They are going to town, right, bouncing off the walls. There are other times they are down. And a lot of times we notice this and we don't notice this. And it takes so

much energy in a day for some kids with attention deficits that at some point, they're going to drop. And it may be after several days, and we tend to think, well, why are they so grumpy, or why didn't they come to school? Well, there's a lot that happens that sometimes we're not aware of, if we don't think about it.

Okay. Talk about memory and metacognition. So storage and retrieval are important aspects to memory, being able to store information, and then to be able to retrieve that information. Working memory, we have found, or finding -- I say "we" -- researchers are finding that working memory has a lot of impact on memory for kids, and being able to process information accurately. So working memory basically is what you're doing now, or most of you, probably, okay, and that is, you're watching me, you're looking up here, you're hearing me, you're thinking -- you're doing multiple tasks at a time. And you're trying to make sense of what's going on. At the same time that you're making -- sense-making, you're starting to connect back to what you already know, and you're making connections and new meaning from that. Kids with working memory difficulties have difficulty doing that real-time, like you are now, okay? And they often times have difficulty with self-regulation behaviors to ensure that they can be more proficient with their working memory.

Meaning is one of the most important things to think about in relationship to memory. There's been a lot of memory studies around, and one of the things that constantly comes out is, the more meaningfully, the deeper levels of thinking that kids are able to engage in, the more likely it is they're going to be able to remember it, but also be able to remember it and use it in more higher-order situations. And so meaning is really important. So when we start thinking about math, and we think about meaning, and we think about strategy, if we don't have a good sense of the meaning of math, it's going to be more difficult for us to store and retrieve from memory that level of understanding that's going to allow us to be strategic when we have to utilize it for problem-solving, and for taking risk. And so it was, again, a very important aspect to metacognition and metacognitive awareness.

So some characteristics -- memory storage difficulties, memory retrieval difficulties, working memory difficulties. And then on the right side, again, implications; missing key steps, similar to the attention issue we talked about earlier. Difficulty interpreting symbols or terms that have multiple and similar meanings, so let's think about reading, for example, all right? All right, so we have words in our English language that sound the same, have different letter representations, right? Okay, we also have -- excuse me -- the same letter that is associated with more than one sound, right? Okay, so you know that if you're a reading person, or if you teach reading or have taught reading, that helping kids develop phonological awareness, which is being able to encode, decode, segment and blend sounds and the letters that represent them is a really important and difficult thing for them to do. Okay? Well, if you think about math, think about the many different ways that different symbols mean the same thing. So, for example, one tenth -- one over ten, point one, oh. Anybody want to give me another one? Ten percent, right? What did you say?

>> [INAUDIBLE].

>> Exactly, yeah. So all of a sudden, now you have, like in reading, in math you have the same thing. So if you think about memory and being able to associate the different meanings that are the same for different symbols, or that are different for the same symbol, okay, then you start seeing some relationships to reading. Difficulty recalling math information they've been exposed to -- that's a really key working memory issue that, again, can affect us in terms of learning and being to be able to employ strategies efficiently -- third important disability-related characteristic. So sometimes the hardest thing

to see is the most obvious. So take a look at that picture, and how many legs does an elephant have? Oh -- so when you first -- I'm going to pick on you over there, because you said, "Oh..." So when you first saw the elephant, you thought what?

>> Well, when you first see it, when you just glance, you just think the four legs are coming down. But then you look at by the trunk, it looks like another leg.

>> Okay, so -- yeah. So your brain, our brain is pretty smart. Mine's not so much, but the rest of you all, us, your brain's pretty smart. It really tries to make sense of the world. And the way it makes sense of the world initially is, it reflects back on what it already knows, and what is experienced. And so we all have seen pictures of elephants, we know elephants have four legs. We see a picture of an elephant, we're not going to really question, it's an elephant, right? It's got four legs. But in this case, it actually doesn't have four legs, right? And again, this is a perceptual drawing that gets us to make our brain go back and forth to different ways of looking at that, because what our brain does, when it sees something like this, it starts going back and forth, or one place to the next place to the next place to try to figure out what this really is. And so we think about cognitive processing, this would be an example of a person who, a student -- if I had an actual representation of an elephant with four legs, they may perceive that elephant as having more than four legs. And then they start trying to wonder, well, where are the legs? Okay, so if you start -- if I start trying to figure out where a whole leg is, and I also start putting my fingers around it, all of a sudden, I'm way off task, right? And so when we start thinking about how we process information, and kids who have significant processing difficulties, this can be very difficult in terms of learning, but also then in terms of taking that information and employing it in a strategic way, because trying to employ information about a seven-legged elephant, it's not going to work very well when I'm trying to work with elephants, or something like that.

So when we think about cognitive processing, there are inputs and outputs. So I want you to take a minute, and I want you to, either alone or with a friend, I want you to think about what are different ways we input information, and what are different ways we output, or share information? So just make a list for input and output.

I'm going to start shooting a red laser at your eye. I can tell! [LAUGHS] Don't look at it!

>> [INAUDIBLE].

>> Yeah, yeah. That's --

>> [INAUDIBLE].

>> Yeah. Yeah. It's what I do. It's important stuff.

>> It was work to record it.

>> That was it, yes. That was the most fun thing to do, yeah. Definitely.

Okay. So let's -- so what did we come up with? What are some ways that we input information? Auditorally, okay.

>> Eyes.

>> Visually, okay. So I've got auditory, visual.

>> Sensory -- touching, smelling.

>> Okay, so by touch, by smell. Anything else?

>> Perceptual?

>> Perceptual, what does that mean?

>> See things happening and you just process it without actually doing --

>> Okay. So you're visually processing information, but not doing anything with -- not physically doing anything with it, right? Okay. All right, good. So how about output? What are ways we output information?

>> By languages.

>> Language.

>> [INAUDIBLE] impressions.

>> Okay, so we have verbal, okay. Right. We have nonverbal, right? What else do we have?

>> Writing.

>> Writing?

>> Yeah, so motor, okay, write. Okay? All right, so if you think about that, then we'll think about this idea of inputs, okay, to outputs. When kids who have cognitive processing deficits, what they have is they have -- and this is a very simplified version, but the little circles represent neurotransmitters, okay, and when we are inputting information, we are inputting information that is electrical in nature, okay? And we have neurotransmitters that help process the information, okay, that we're receiving. The first example is the example where, in some cases, for a particular input-output network, there, for some reason, there is a place between a synapse that the neurotransmitters can't get across, it's like a block. Okay, it's like a big old wall they can't get over, okay? In other cases, there are situations where there are little glitches in the synapses between the neurons, and the neurotransmitters have to figure a way to get around them. And so the information here doesn't get processed. The information here gets processed, but it could be slowed, or because it's got to go up and down and around, it may come out a little bit quirky, okay, a little bit different than what it initially is, or was. So there are many different routes. And if you just start thinking about just a few that I have there, and you start thinking about just the input to output routes, you begin to see that kids could experience multiple input-output cognitive processing difficulties. Now, I was just talking with Jared, okay, and [INAUDIBLE] when he shows an example. So Jared, he was fixated on that elephant, okay, and he was literally trying to -- with his eyes follow the line of each leg down to the foot, right, and you started getting a what?

>> Headache.

>> A headache, okay? So he was trying to process visually information, and if I had then asked him to now, okay, take the elephant away, and now draw that elephant accurately, what would probably have happened?

>> I would have broken my pencil.

>> He would have broken his pencil, or thrown it at me probably, right? So again, you know, thinking about just that little experience and how this may play out for many kids who have true cognitive processing deficits, think about how that plays in a role in terms of being metacognitively aware. He was using all of his energy in trying to figure out what this representation was that was visual. Then trying to ask him to apply it to something and use it strategically, that's probably asking a bit too much, right? So again, the important connection between cognitive processing as a deficit and metacognition.

All right, so I want you to take a look at this picture, and I want you to write a title of a story that you have for this picture, okay? Five, four, three, two, one. Okay, so write a title for a story based on that picture. Hmmm. Okay, all right. "Creepy Evening [INAUDIBLE]," you have a long title. That's going to be quite a long book! Okay.

>> We're writing the [INAUDIBLE]?

>> No, just the title. Over-achievers? All right. Okay. All right, so I'll take a look at some of the titles that have been written, and I'd like -- would you share your title with me, please?

>> Death skull.

>> All right, you all see this, I'm just going to hold it up for everybody to see. A "Death Skull." So, Death Skull. Death Skull. You know, I don't know how you do things in Pennsylvania, but we don't talk about and celebrate death or evil kinds of things that may scare the rest of us and send us home not being very happy. And by the way, I just want you to know, and I'm going to take this with me -- hold on -- because I'm going to go back if I can work my command module, I'm going to go back, because I want you to see -- I can't do anything! Oh, no, no! Damn! Oh, geez! Can we do another videotape of this? Would that work? Oh, gee! All right. So I went back, and it took -- I Googled this, okay, give minutes, man. That's a lot of time out of my day, all right, and I found this famous portrait called "Vanity," okay? And Vanity is a famous portrait of a woman, right here, the side of her face, profile, looking into a big portrait mirror, okay? She has a lighter candle here, and she -- this is her front of her face, the reflection, and this is her gown, and her vanity with all her things on there. Now, it's a famous painting, and I took the time to do that. But -- what is your name?

>> [INAUDIBLE].

>> What's your name? Your name.

>> Oh, Christy, sorry.

>> I mean, it's only been, like, two minutes, okay? You know? So Christy. Christy thinks it's really funny, okay, to come up with something like, "Death Skull." Okay? And if I wasn't a better man, okay, I would probably just right now tear this thing up in front of you, okay, because of what you tried to do to make

fun of what I was trying to do, which is a serious moment, you know. So, that's all I got to say about that, okay? All right, so this is an example -- and if any of you have seen Fat City with Rich Lavoie, you probably have seen this, okay, the idea again being that here is an example of a visual image that me as a teacher expects you to perceive, because it's what I put up. And when you didn't, Christy -- Christy, right?

>> Right.

>> Okay, when you came up with something different than what I expected, guess what my first reaction is?

>> Anger?

>> Yeah, you're trying to pull something over on me, right? You're trying to -- you know. And so I'm making, then assumptions about the student based on what I know I put up here, that I know, or I think the student has perceived it or not, okay? My reaction to you, if I then ask you to take a risk about something, and use some strategy, what's going to happen?

>> It's not going to happen.

>> You're not doing it, are you? Yeah, no way. Okay? So remember, sometimes these characteristics, we react and engage in behaviors that further make it less likely a student is going to be able to use strategy and to be strategic, because they don't want to deal with that anymore, okay? So there's some characteristics. When kids have difficulty with processing, they perceive information differently. It's not wrong, they perceive it differently. It's because that's how they are actually processing it. They can have disruptions in how information is processed, or disruptions where they may get some of it, not all of it, or it may be slowed in terms of processing. Some kids would listen to me speak right now, and they would think I was speaking really, really fast, okay, because they're processing speed for auditory information -- it takes them longer to process each auditory sound. And so that's important for us to remember. Okay, so then implications for learning and mathematics on the right side.

All right, so now we have talked about what metacognition is, its relationship to mathematics, and what are characteristics that can make it difficult for kids to engage in metacognition, and to be strategic based on three disability-related characteristics. So now we're going to move into -- what do we do, okay, or what can we do? So there's been some neuroimaging studies out there that have been helping us learn a little bit more about the brain, okay, and how the brain operates. So I wanted to share that with you, because it really helps us and informs us about what's going on and what we can do as educators. So I'm going to show you the first image. And this is the male brain, okay? So if you know anything about neuroimaging, that when you use neuroimaging, or PET scans, the places on the brain that are more active light up, okay? And so if you -- you can tell for the male brain that -- and this is the part we might have to edit with the video, I don't know -- but you can see that the parts that are largest, okay, mean that there's more brain activity engaged. And there's an acronym, fun acronym, they didn't tell me what it stood for when I was -- even through the periodical when I pulled this image from there, but it must mean something very important to the male. The listing particles actually seem to be the smallest place on the brain for the male, the attention span also seems to be. Oh, avoid personal questions at all cost area, that's kind of small. You can't even see the [INAUDIBLE] one. The TV and remote control addiction center -- pretty big. The ability to drive manual transmission -- pretty big. The [INAUDIBLE] cell -- not so big. You get a sense of that, right? And then just so that you know, the

listening to children cry in the middle of the night gland is not shown, due to its small and underdeveloped nature -- best viewed under a microscope. I got a little -- that's some laughter, right? I saw men not laughing so much, huh?

So in the interest of equal opportunity, okay, now we'll take a look of the neural image of the female brain, okay? Okay. Oh, we're getting some good laughs, okay. Well, that's good, all right! Yeah, you got -- well, I'm not even going to name them all, because, you know, you can see them. You can tell this image was a little dated, because the Melrose Place memory center is still showing up. The footnote at the bottom is the put all into the car and be quiet during the game glands are active only when the shiny things and diamonds old factory has been satisfied, or when there's a shoe sale. Okay, I did ask for permission, without showing this, actually, to the leaders of this conference, and they gave me the full okay to do this, so I did it. So it's their fault if something -- this headache's getting bigger, I think! All right.

Okay, so let's talk about instructional practices. Again, struggling learners can be strategic when teaching them to become strategic is the priority. So there is some research that certainly suggests that many kids with LD do possess metacognitive skills, but they're qualitatively different. They're not necessarily developmentally delayed. So it's important for us to understand that many kids with disabilities have the capacity to be strategic, okay? They simply and effectively apply metacognitive strategies. So when we're thinking about effective instruction, it should include explicitness, it should include strategy instruction, teaching, self-regulatory behavior, and emphasizing both the doing and the what of mathematics. So both the content standards, but also the practice standards. And we're going to emphasize a little bit more on the practice standards for the next few slides.

So some important ideas to remember, and these were included in your handout, teach strategies using explicit systematic instruction. One of the strongest instructional practices with consistently high effect sizes for kids with disabilities is explicit instruction that incorporates strategy instruction, and this is particularly true as kids get older. Provide kids with, or students, with cues and prompts, and then -- initially, and fade them as they become more proficient. Create an atmosphere that reinforces taking risks rather than on always getting the right answer. Reinforce students to think before they solve, provide ample amounts of specific corrective feedback and positive reinforcement, and be purposeful in your instructional focus, with respect to strategy. So these are not anything out here that you don't already know can be important for kids. The important thing is that this becomes a focus for you, when you are trying to work with kids and trying to help them become more strategic.

So here's one example of helping kids become strategic. This is -- you may have seen this particular graphic organizer before or not, but the importance of this example is not the organizer itself, it's the fact that it is organized in a way to support kids making connections between two mathematical concepts in this case, okay? So this happens to be with multiplication, and on the left side is repeated addition. So one process of multiplication --

>> You're battery's dying.

>> My battery's dying?

>> On your iPhone.

>> Thank you very much! And how did you know that Jared?

>> Yours is pretty explicit, visual cue...

>> Thank you very much! And you were very aware of that, which I appreciate. All right. So -- I don't know what I'm doing! Obviously I don't know what I'm doing. I hate you! Geez! Well, there. Be good. Be a good boy. All right, so on the right is the process of arrays, which is a second process for doing multiplication. You have two boxes where the student identifies, or you with the student identify the different characteristics that represent repeated addition, that represent arrays. And then we start talking about and recording what's similar and what's different, okay? And then why is this important? So this particular graphic organizer is structured in a way to help kids begin to recognize connections, and then with graphic organizers like these, they become ways for students then to have something as a cueing mechanism to help them as they are starting to work with multiplication by repeated addition, or multiplication by arrays. And one of the things that we've been working with with the project, with the math RTI, is looking at different ways to evaluate students' problem-solving abilities, okay, or their math reasoning abilities, their fluency abilities. And one of those is called the solo rubric. And when kids -- one level is when kids actually can use one approach to attacking a problem or a task. Then the second level is they may be able to use more than one. And so this is an example of how we can help kids begin to develop more than one approach to thinking about and reasoning about a particular mathematical process.

So this happens to associate directly to the mathematical practice from the Common Core, looking for and making ease of structure, okay? So I want to make sure that as we're going through each of these that we're starting to associate this with what a lot of folks say we can't do with kids with disabilities. Okay. There's been a lot of work around the use of explicit strategies for teaching different problem-solving related to mathematics, from more explicit learning strategies for a particular concept or skill to more general strategies. And these are just some examples. With this, I also want to say there is some really promising research around schema-based instruction that is something you might want to take a look at at some point, and it's -- oh God, I'm drawing a blank on her name. Asha Jitendra. Yes. Or Asha Jitendra, depending on where you come from, all right? And her work is really promising because what she's doing is really getting kids to see the relationships among concepts within a particular type of word problem and its relationship to the mathematics, and developing a graphical approach to attacking word problems. And so it's something that's really interesting and something you should probably take a look at. These are just examples of simple mnemonics that relate to different specific mathematical ideas.

This is a more general problem-solving strategy; it's from the Polya problem-solving strategy literature. The point here is that we have -- we can use more general strategies or more specific strategies, depending on what we're trying to do. And if we're being purposeful, I ultimately want kids to have access to multiple strategies, and I would like for them to be efficient with those strategies that have the most likelihood of being successful with different kinds of mathematical problems, right? But sometimes I also have to recognize that there are specific types of math tasks that may sound simplistic to some of us, but actually our problem-solving situations for kids who are struggling that we can help if we use mnemonics, in this case, that get at these specific areas. So this is just an acronym that's similar to -- it's for order of operations, Many Dogs Are Smelly. There's cueing here to highlight that multiplication or division can come first, not one or the other, there's not a first one or a second one, the same thing with addition or subtraction. This one is the draw strategies for basic operations, which helps kids become independent at solving operations, basic operation problems. This one is place value, it helps kids think about and determine the value of digits within numbers, particularly when kids are starting to work at multi-digit levels, and they're trying to reason the place value and what that means in

terms of operations that they're algorithms they may use to solve that problem. And this is just an example of a visual for long division, okay, strategy. Again, this relates to the math practice of making sense of problems and persevering in solving them.

Okay. Word problems -- oftentimes kids have a lot of problems with word problems. Of course one of the issues that kids have is that they are -- they have difficulty pulling out information, determining what's important within a story problem, right? And certainly there are ways that we can cue kids, you know, there's strategies they get about circling important information, underlining what you're solving for, that kind of thing. But -- and that can be helpful. But we also have to help kids begin to see the structure within the problems, right? And this is an example, and I did a study with eighth grade students who were in a basic math class, who were doing basically pre-algebra kinds of -- beginning algebra kinds of stuff. And we develop word problems, number one, that reflected their interest and incorporated their own names, and they liked it. And then we set it up so that we scaffolded the support that they were provided to solve the word problems. So we were teaching them a strategy called Fast Draw; in Fast Draw the fast part was helping kind of begin to identify what's important. But what they were having most trouble with was setting up the math, okay? So I'm not going to spend a whole bunch of time with that, but again, there's quite a bit of good research out there about how to help kids who are struggling engage in discourse about mathematics, and things to be conscious of and to think about when you're doing that.

All right, the last thing I want to share with you is the idea of structured dialog sheets. And that is using structure, almost like a closed technique that we do with reading and spelling and comprehension, and using it for math. So starting to structure it so that we provide kids with a structure for some of the thinking, but not all of it. And they fill in the part that's not all of it, and it gives us an opportunity then to again with students talk about, why did you do this? Why did you put this? Why did you put that? And it gives them, again, a way to have something to put in their math strategy notebook to go back to when they are engaged in working with the particular math concept that's appropriate. This is just another example of that. And as you work with kinds, you'll get to the point where you're only using, like, one or two or three key words, and they're doing the rest of it until they're able to talk about it without having a structure in place to go from.

So again, a lot of what we can do is, using different tools and structures that help kids format, think about connect mathematical ideas, and to structure it in ways they can be successful initially and then scaffold and fade the amounts of support based on how they're doing, and ways to help them begin to self-monitor and see their progress and success. And these are all keys to helping kids be strategic, more strategic and more metacognitively aware, more self-regulatory in relationship to math and learning math and doing math. And that's related to the third mathematical practice, construct viable arguments and critique the reasoning of others.

Okay, so in conclusion, tried to cover what does it mean to be strategic, the relationship between metacognition and mathematics. A little bit experiencing what it's like, and why kids who have mathematical -- excuse me -- metacognitive awareness difficulties, why that's the case with respect to three different disability characteristics. And then some examples of how you take already what you know, okay, and start thinking about how it applies to helping kids become more strategic, using explicit instructions, strategy instruction, cueing and scaffolding and supports, and providing them opportunities to use it to monitor their progress and to begin to see they can be successful and take risks, and it's okay. And so that's kind of, hopefully, where we ended up at the end of today.

All right, so at the end, just remember, for kids with disabilities, math can be a daunting and scary proposition, right? They need teachers who want to understand, and who make teaching them how to be strategic thinkers a priority, lifting them up through the use of effective practices. Importantly, to become adept at approaching problem-solving situation in strategically successful ways. I love this picture. And ultimately, making sure, helping them be prepared for what may come next. So at this point, I want to say, and we'll have questions and discussion after this, but this is something I've always -- I was told one time, and I've always cherished it. The gift -- yesterday is history, tomorrow is a mystery. Today is a gift, and that's why they call it the "present." And it's been nice being with you all today. So it's been a present. And I hope that you've been -- it's been beneficial for you. So without anything more, let's go ahead and see if there are any questions, comments or discussion that we have. Yeah?

>> Just one comment. One of the things I find is that the stimulus items they provide in most textbooks are really bad. One that I saved for years is, it has a student in front of lockers, and it says, "Tony forgot his locker number. He knows it's between 100 and 195. He knows it's a prime number," it goes on and on. And one of my students actually said, "If he knows all that, why doesn't he know his locker number?" [LAUGHTER] I mean, a lot of the items are really awful.

>> Bad. Yeah.

>> They use language that no one uses. I used to talk about one textbook that I really liked, but it talks about, like, "Jim dug a hole six feet deep. Bill dug a hole two feet shallower." No one says that, you know? So I think one of the problems that really is related to our students with learning issues is the language they use in [INAUDIBLE].

>> Yeah. I think that you're right on. And I'm looking at my literacy teacher over here because -- and I think one of the things that we failed to do from a mathematics standpoint is, we don't think about the literacy practices that we know are helpful for helping kids make sense of text and applying it to mathematics. And I think that's a perfect example of that. And I also think that it goes back to the point -- one of the points we're discussing in the previous session on evaluating math curricula is that if we have curricula that are engaging kids in problems that are nonsensical to them, maybe we need to be adapting those problems to make them sensible to them, right? So I think that's a really important point. It think it can be a big barrier for kids. Yeah. Yeah. And certainly kids who are English language learners in particular, or kids who their experiences are very different from what that problem represents and the vocabulary represent, the uses. Yeah? Other questions, yeah?

>> I'm just wondering how you would approach if a student is doing a problem incorrectly or something, how do you approach it in a way that doesn't make him want -- not take risks after that. Because I'm just wondering, like, if I just seem at the point that they're going through it the wrong way, I don't want to shoot them down.

>> Well, the best thing to do is stop doing that. I mean, that's -- you know. Okay, that's a very good questions. You know we say taking risks, about kids taking risks? Sometimes as teachers, we have to take risks. Okay? So -- and this is something I get a lot about from my beginning teachers, okay, and also teachers who aren't special ed teachers, in that they are afraid that this little thing is going to break and die, if I do something wrong, right? Well, the reality is that kids want to know what to do, right? And one of the best things you can do is say, "Please sit down and take a look at what you're doing." You know about diagnostic interviews, right? A math diagnostic interview? Asking a student, "Well, you know, I'm noticing you're doing this. Can you tell me a little bit about what you did and why you did it?"

Number one, it gives you an idea of what the student's thinking, right? But then second, it gives you a great opportunity to say, you know what? I never thought of it that way, you know, that makes a lot of sense. But you know what? I found that this is something that can really help, and it helps us be more accurate and more efficient. And it gives you a natural opening opportunity to say -- and then you can say, "Well, why do you think I did this instead of that?" Right? And so it's not an opportunity to look at it and say I'm going to tell a student they're doing something wrong, it's a perfect opportunity to find out what they're thinking, and then based on what you're hearing, coaching them to start thinking about it a different way, right? And I found that very, very helpful for myself, when I'm working with my -- with teachers and my pre-service teachers who are working with kids, because then it gives them an opportunity to see that student -- in fact they like -- they don't fall apart, you know. And then it also reinforces to me that I don't have to have the automatic right answer right there. But what I can do with the student is together figure out what might be an answer to helping him or her. Does that make sense? Yeah? Good. Thanks. Other questions? Going once... Ah! Yes?

>> I'm not even sure -- I'm not sure if this is, like, an actual question, but I --

>> Go on, take a risk!

>> Well, I'm going to take a risk, to see if you have some sort of answer. So one of the struggles that I have, I work with middle school and high school students who are all in regular classes, but they have some sort of learning differences. And one of the biggest struggles we have in math is that there's not -- I feel like for that student, there's not a sufficient amount of repetition and practice before the class moves onto something else. And so I guess I'm wondering, like, I really like that in the word problem how there was, like, with scaffolding, do a little bit of scaffolding, do it without scaffolding -- but I noticed the word problem was great -- basically exactly the same, with different information. And so I don't see a lot of that in the regular math programs. I see, like, the stimulus changes each time. And so I'm wondering if you had any suggestions regarding strategies when that...

>> I think there's two things. We ought to realize what our ultimate goal is, which is that, which is for a student to be able to flexibly think about the problem-solving context, and then be able to apply the correct strategy and be able to demonstrate the mathematics within it, right? Okay. However, I think you're right, that in many cases, curricula are not designed with students with disabilities in mind, okay? And to most students of mine, just because of -- and I'm going off on a policy thing here, but -- you know, our curricula has become compressed, compressed, compressed because our tests are at a certain point in time. The curricula is made for the state for the test, and therefore we're in a situation where we're teaching a year's curriculum in three quarters of a year. Okay, so now, so I think what you're experiencing is real, right? The second part of it is, I think in that case, I think what you can do in this situation is to in a maintenance and continual practice frame, work at a level of scaffolding that is more reasonable for the students that you're working with, and focus on those concepts in areas that are the most important. So for example, in your curriculum for, let's say it's middle school, and you're working with seventh-graders, okay, so and if you're looking -- and you're correlating what you're doing with the core curriculum, is looking at that core curriculum and saying, okay, these are the most important foundational concepts that we need to focus on. When I'm doing more intensive intervention with students, right, and I'm going to focus my time on extending that scaffolding for those concepts, rather than trying to do it for everything. I think to me, that's the most logical and most doable way to do it. It does take -- okay, we've got to make some judicious decisions about what we're going to focus on, and what we're not for this more intensive piece. Does that make sense to you? And I think that

would be one way to conceptualize the dilemma that you're in, that you're seeing. Okay? That was a good question. The answer might not have been as good, but I gave it a shot. Yeah, okay? Okay.

All right, well, if there's no other questions, I enjoyed having you here, and being with you. And I hope you have a good rest of the conference. I also hope that the snow goes away soon and the warm comes quickly, and I hope that you have a good rest of the year. If you have a question that comes up, my email, I think, is on the handout, should be. So you're welcome to email me. Just put "PaTTAN Conference," so I know that it's from somebody here, you know? And I'll try to address your question. Okay? All right. Thank you very much!