NARRATOR: Welcome to the Universal Design for Learning series, a rich media professional development resource supporting expert teaching and learning from the National Center on UDL. In this session, we will hear Dr. David Rose's keynote, presented at the invitation of the U.S. Department of Education Office of Special Education Programs for the annual OSEP project director's meeting in Washington D.C.

During this presentation, Dr. Rose uses a unique musical metaphor to explain and demonstrate the principles of UDL. There are a number of musical and other terms used during this presentation. A glossary of terms is included in the resource section for your reference.

DR. DAVID ROSE: Thank you for this chance to speak to everyone, and I appreciate the honor in doing so. And I also want to say that I'm clearly here because of the enormous work of the people at CAST and I'm just representing that work. I wanted to say why music. I'm going to talk a lot about music today. In reflecting, I realize that at a number of key points, I've used music to make my point when I've been teaching. And I'm not a great musician at all, and it made me pause to think about why I would do that. And I realized that, in fact, it's always been an alternate representation that when I'm trying to get to a hard thing, I guess I've instinctively always wanted to find another means to get there, another representation of the point.

So what I have chosen to do is to reflect back a bit and come up to the future, telling the story of where I've been and where I think we're going entirely through music today. And we'll see how it goes. Some of these a little bit -- a couple of chestnuts that I've certainly talked about before. But like anything, I've found that I've learned a whole lot of new things, both from the music and from the special education that I will get to.

So Bach to Lady Gaga. The first part of my career was looking for universals. I was a developmental psychologist teaching in child development at Tufts University, and I needed a way to have kids understand -- have students understand the big, global universals of child development. And I think most of you are familiar with all of this work, but this was the first talk I ever gave that I actually liked. And I used Beethoven's Eroica, so I'd like to just play a little bit of Beethoven's Eroica for you.

[MUSIC PLAYS]

DR. DAVID ROSE: Okay, so I would typically stop it there and ask the students, what would have been the reaction to that music when it was premiered in Leipzig in 1805? And a discussion would ensure and people would ask the right questions. Well, it depends on what was music like and how different was

this and all of those things. So we'd get out a lot of the ideas. In that time, Piaget was a major figure. So we'd get out the idea of the progressions that Piaget talked about and how change happens. So then I'd have to get into the music a little bit to talk about, well, what was this like compared to the music they were listening to? Was it the same thing? Was it very different? So on. So I just want to play a few -- just one more passage from this.

[MUSIC PLAYS]

DR. DAVID ROSE: All of this would seem -- all of this would seem very familiar, very classic, very Mozart and Hayden. This gets a little scary. It's a little much. Ah, great music. Okay, now what I want you to do is listen to the chords that are coming. Notice everything's off the beat, syncopation. A lot of power coming. Try to hit the beat. Can't find the beat. Dissonant chords coming. Back to beautiful. It's those chords. Coming again, last chords, listen to these. Nothing's on the beat. Dissonance.

Too much in some ways for Leipzig in 1805. In fact, there was, as you might expect, quite a reaction. And here's one reaction, was shouted out in the middle. By the way, it's much longer, vastly, two to three times longer than a symphony they had heard before. And so here's my favorite comment: I'll give another kreutzer if it will just stop.

A very mixed reaction because, in fact, if this is the periods of classical music, if we look at where did the Eroica happen, the Eroica happened right at the end of the classical stage of music. And it brought those new chords, the syncopation, the great, colossal chords that were not harmonious in the way that the previous period had had them. And in fact, what happened was people had to do what Piaget talks about. They were in a stage called the classical period. And to assimilate this music, they had to actually accommodate how they understood music, that it could include these stretches of emotion, these difficult chords, these dissonances that didn't sound right.

But it was so close to classical period that in fact they were able to accommodate, say -- at least a lot of people, that does feel like music. But music must be different than I thought music really was. And lots of you remember from your old days words like perturbation. Beethoven's Eroica was the perfect perturbation on 1805, based enough on classical symphonies that it could be assimilated, but enough of a stretch that we had to accommodate music.

And here's a great quote from Grout's History of Music. Romantic or not -- because the question was, is it romantic music or classical? Beethoven's music was the most powerful, disruptive force in the history of music. It opened the gateway to a whole new kind of music. Right at that transition. I like the

idea of the disruptive force, but the key thing was the idea of regular stages, that there was a transition from a stage like classical, that everybody was in, to a stage like romantic, that Beethoven ushered in.

From that, though, when I was teaching child development, I was looking for universals. What are the big things that you could tell kids about the way children develop? But the same concert actually brings up the point which was to dominate the rest of my life, for sure. And that is what's really universal about what happened in 1805 in Leipzig is its variability. And there was everything. There was people who thought it was the most gorgeous piece of music ever, and people who just wanted it to stop, that variability was what Beethoven faced in 1805.

So I want to talk a little bit about variability. This is my wife Ruth and I, and there's variability between us in regards to music. Ruth has perfect pitch. Perfect pitch means that whenever a note is played, Ruth knows exactly what it is. She doesn't have to sing to herself or think about it. It's just the way that you recognize orange. When someone plays a 440A, she just says A. She can't even stop herself. Me, not so much. I have a generalized view of pitch. Things are high and low, and it's probably much closer to the way that most of you are.

And we know something about the neuroscience of perfect pitch now. And you can probably see this little, pink, highlighted area on auditory cortex. And we know that, in fact, people with perfect pitch have a difference there. There's actually a couple things that have been found recently. One is they seem hyper-connected. If you really look at the close anatomy, there's more connections, more synapses, more interconnections among the parts there. Hyper-connected. And there's an asymmetry. It's much larger, this area for pitch, on the left than on the right. So we can look at someone's brain and say, wow, that's a great brain for perfect pitch.

The question, though, that I would like to ask you and myself is, who has a disability? So for Ruth, who grew up in a very musical family and all that, for Ruth, her view of happy married life ahead came from the sound of music. And it would be that we would have a bunch of kids and we'd be traveling in a Volkswagen Bus, this is 1969, singing in eight-part harmony. And that would glue a marriage together.

And to her, discovered way too late in our relationship, the idea that I had this small, BB-sized area on the left plenum temporale was a bitter disappointment. And even worse, that I passed it on largely to our kids so that, in fact, we can't sing an eight-part harmony. And so, to Ruth, for whom all of this is so natural and easy, she has this very disabled family that she travels with. And it's hard for her to

even picture what it must be like to go around in life and have no idea what the pitch of music is or what I'm supposed to sing next. Okay?

But the lesson of this for me over the last decade has been understanding disability in a much richer way. So if we change contexts, disabilities change dramatically. So I want to tell you about a different context. This one I look much better. We go to a church together, Ruth and I. And in church, it's my one chance during the week to sing. And I think you're supposed to sing, so I sing loud and I'm out there. But of course, I'm really not on exactly the note that's in the hymn book.

And so picture Ruth. Here she is, she looks at the note in the hymn book and she knows exactly what to sing. But I'm not really singing that. And I'm next to her and we have 45 years of marriage and there's some reason to want to figure out how she can make this work for me too. But the person on her other side is also not singing at 440. And we go to this really old New England church and the organ has long ago drifted away from 440. It's not even playing A anymore. So for Ruth, singing at church is a terrible consternation and she can't really do it because the notes in the book and the people around her and the organ, they're all weird and not right, except for the ones in the book.

So Ruth doesn't sing with joy. And I love the beautiful irony of being in church, where everyone else in the church, more like me than her, I think of them as looking around and saying, isn't it too bad about Ruth? She married somebody who can't sing. She could have married better. I know they all think that. So the disability is, in fact, entirely contextual.

NARRATOR: Let's stop a moment and think about what has been discussed so far. Dr. Rose asked an important question. Typically, we think of disability as existing within an individual, but the UDL framework challenges that presumption. Stop for a moment and reflect on how a learning context creates the illusion of disability in learners. Think of an example and write it down, or share it with a colleague. When you are ready, click on the continue button to resume the video.

DR. DAVID ROSE: So individual differences became of great interest to me, and especially the way in which we think about things like disability, who's disabled and who's not. So I want to go just a little bit more into the nervous system here. Some of you know this. We typically divide up the brain, as many do, into three sort of largeish networks that help us understand things like music.

The back of your brain is an area that's devoted to recognizing things, taking information in from the outside world and turning it into usable knowledge. Right where these arrows are roughly in auditory cortex, you actually have a lot of things you recognize about sound: its pitch, timbre, duration,

loudness, contour, direction. There's even a longer list. Direction means where is it coming from. Auditory cortex has a whole host of things it's learning from sound. It's fabulous. And you do that with the back part of your brain, and people really differ. Some people are really good at any of these and some can be really bad at them. And there's usually a normal distribution.

It actually grows over time. Children, as they grow up, learn to engage more cortex in the listening to music because they make more meaning out of it. Those things I showed were just the common, initial elements of music, but we actually then make meaning, make emotion out of that music. And that will require a lot more of our brains. You can see the difference here between non-musician and musicians, turn out to have brains that you can see and say, oh my gosh, that's an expert brain listening to that music. Look how much they get out of that music. So those individual differences are key.

But there's actually more to the brain. I think you've probably seen that there's a bunch of books that have come out recently about music and the brain. There are actually three broad areas, same ones we talk about in UDL. We recognize the sounds and make meaning out of them with the back part of our brain. With the front part of our brain, though, this is where expertise comes, where we learn the strategies to attack music, to listen to it intentionally and carefully, to be an expert listener. And also to be able to make music. This is the expressive half of our brain, the front part, to be able to actually generate, compose, and make music. So music requires both being able to perceive and make sense of it, secondly to be able to make music and attend to it carefully.

But then thirdly, at the center of our brains, right where it should be, the most powerful and important things of our brain, are the parts of our brains that make priorities, that say, this is important and this is less important. For those of you that are into this, limbic lobe writ large, affective networks that say -- that guide us by saying, this is of value to me. This is frightening, this is exciting. These are the value networks that really push everything else, push and pull everything else.

So when we listen to music, actually, we listen with all three of those parts of our brain. I've shown the first one here, recognition networks. Auditory cortex listens to the elements of sound and makes them into music. But strategic networks at the front of our brain, this is showing a person who is actually a jazz musician making music. Then what lights up is the front part of the brain. Front part of the brain lights up like crazy because he's making music, not just listening to it. And thirdly, when we listen to music, we listen with the center of our brain. We listen with affect. The whole point of music is to make us feel something. So the more they study -- you have to be more careful in your studies -- we find

it's the center of the brain that lights up with music because we feel it, and that's what the composer was hoping we'd do.

So with that kind of tripartite view, people have begun to study and see there's individual differences everywhere: in how we perceive and make sense of music; in how we generate, compose, and perform music; and how we feel about music. These are all incredibly different. So all of these images are average. When you look across individuals, you see very different patterns.

Meeting that challenge is what's been the latter part of my work and the work at CAST, is meeting the challenge, which is universal, of variability. I want to stress that point that what is really universal isn't what Piaget found. What is really universal is the variability itself. We are incredibly variable. Universal Design for Learning is an attempt to -- how do we meet the challenge of that variability?

So now I'd like to kind of flesh this out a little bit. And I know you're already saying, where's the music? Okay, so now we're getting into the more heavy music part of the talk. So I'd like to play just a little bit of Bach's Toccata and Fugue in D minor.

[MUSIC PLAYS]

DR. DAVID ROSE: One other part.

[MUSIC PLAYS]

DR. DAVID ROSE: Oh, one more section. I'll make sense of this later.

[MUSIC PLAYS]

DR. DAVID ROSE: It's pretty hard to make sense of that piece, although it's a beautiful piece. So what we talk about in UDL is providing multiple representations as a way to help people make sense, to make meaning out of these things. I want to show you a neat representation, not one we made, but I'll tell you how to get it later. So this is going to be a multiple representation: two representations rather than one.

[MUSIC PLAYS]

DR. DAVID ROSE: Watch this next section. Look how clear the structure becomes. Hope you liked that. I want to talk about what's happening here from a UDL perspective. We have the first principle is provide

multiple representations. Back half of the brain, how do we present enough representations? And there are several things I just want to highlight that we did in that passage.

One of the guidelines is provide options for perceptions. Make sure everybody can perceive this. And in this case, we're offering alternatives for the auditory information. Because its primary form was auditory, let's give an alternative, which is visual. Second guideline: provide options for language, mathematical expressions, and symbols. People are going to really differ in their ability to know what the symbols and the words, the expressions that are written, all of those very different by different individuals.

And in this case, one of the things that the visual can do because of the difference between vision and hearing, which is to say vision is able to allow you to think things simultaneously; hearing much more sequentially. So you're able to actually clarify the syntax and structure a bit of this piece and we're obviously illustrating through multiple media. Let's choose a bunch of different media. It does a few other things. That is, notice it puts the music into a simpler form than a notation system on the graphic, which is impenetrable to lots of people. So it supports the decoding of the music.

But I want to go a little bit deeper into this piece and show how the representations get us at a higher level. First, I want to give you some background knowledge. And what I'm going to do now is talk about the things that we've learned essentially from all of you in this room. What are the things one does from our evidence-based work that would make representations clearer to different individuals? So at CAST, all we've done is taken your work and say, how do we embed that in things so that it's there always when we need it? So I'm going to give you some background knowledge.

We can just attach it to that figure, but to tell you what a fugue is because we're going to move to the fugue. A fugue is a composition built upon a theme that is introduced at the beginning, repeated in different voices and contexts, and recurs frequently in the course of the composition. Is everybody with me on a fugue? A single theme. We're going to see it in a bunch of voices, a bunch of contexts, and many times. Okay, so that's background knowledge, what a fugue is.

And then I'm going to do a few things which we could do electronically, but I'm going to do them as a voice just so that it gives me a role here. Here's the end of the toccata, and the fugue is about to start.

[MUSIC PLAYS]

DR. DAVID ROSE: This is a theme. Aha, another theme. And now they're playing with each other a little bit. Just a little echo. Holy cow, I hope you can see another theme is coming. Let me skip just a little bit ahead to the part that I played that was very complicated. Watch these things. It's hard to hear. There it comes again in the alto. It's complicated as they play against each other. There it comes; you can see it coming. Upside down. Right side up. Upside down again.

I think you're getting the feel for how you can see some of these things much easier. Now that's not true for everyone. I have an individual that I go to church with, actually, who has had a brain injury. And for him, actually music is an intensely important part of his life and he's very good -- he's a mathematician, very good at listening to music. So I did this for him and he says, I already knew that. He actually heard all of those internal upside downs and reversals and all of that. He heard it, which seems incredible to me. But I said, give me a break, let me listen to it with the visuals on. And he said, fine, okay. But then I will say he got totally into watching it. And we did it together and then he finally said, you know what? There were ones in there I never heard, which I thought was cool. I don't win many arguments with him.

A multiple representation allows us to do a number of things. And just to highlight back to the third guideline under representation, provide options for comprehension. How are we going to perceive it? Not just how are we going to know what's symbolically and structurally there, but how are we going to actually make meaning? So I did something to activate a little background knowledge to tell you what a fugue is, to give you a sense of where we're going.

And then the colors, the individual who did this made the colors highlight the patterns, the critical features. You're heard all this language because this is the research you've done, just instantiated in a digital medium to say, let's highlight the patterns so people can see them as well as hear them. And then guiding information processing that I tried to talk a little bit above it to guide where to look. Look here, so on, as good teachers do and as good media, when we design media well, can do as well.

Those are the three principles about representation, principles about making sure everybody can perceive it, making sure all the symbols are available to everybody, and making sure that there are the supports that we know to work built in for comprehending it, really understanding it. Here they are just highlighted with that piece of music.

And I want to go to variability in the front part of the brain. And these I know are too small. I realize that you're a long way away, so I'm not going to go into them in anywhere near the detail I just

did. There are guidelines for action, expression. What are the ways in which we provide enough options so everybody can express what they need to express? The first are, do we have options for physical action itself? Can everybody act? Secondly, are there the skills? Are skills required, that there might be other ways, other skills which we could use for communicating? And lastly, third guideline, options for executive function. Not about the movements, not about organized into skills, but about can you plan and organize a whole expression?

What I want to now play is a wonderful tape. This is from Tod Machover at the Media Lab at MIT with Dan Ellsey. It's Dan Ellsey you'll see on the screen, and Dan Ellsey has CP. He's in an institutional school in Tewksbury, but this wonderful work, and for points I want to make later, began with Dan and has emerged into a whole way of thinking of making and performing music that's different. But it began with people like Dan, so let's listen to Tod Machover.

TOD MACHOVER: If you're going to make personal opera, what about a personal instrument? Everything I've shown you so far, whether it's a hypercello for Yo-Yo Ma or a squeezie toy for a child, the instruments stayed the same and are valuable for a certain class of person, a virtuoso, a child. But what if I could make an instrument that could be adapted to the way I personally behave, to the way my hands work, to what I do very skillfully, perhaps to what I don't do so skillfully? I think this is the future of interface, is the future of music, the future of instruments.

DR. DAVID ROSE: I love the way he says that. This is the future. This is a graduate student. It's about three minutes; it's a little longer than I should play, but I want you to hear how he describes what they're doing from a person who isn't in our field. A beautiful -- by working long enough with an individual with disability, a beautiful coming to recognize what's really needed. And I love the expression of it.

ADAM BOULANGER: So Tod and I entered into a discussion following the Tewksbury work, and it was really about how Dan is an expressive person and he's an intelligent and creative person. And it's in his face, it's in his breathing, it's in his eyes. How come he can't perform one of his pieces of music? That's our responsibility and it doesn't make sense. So we started developing a technology that will allow him, with nuance, with precision, with control, and despite his physical disability, to be able to do that, to be able to perform his piece of music.

So the process and the technology, basically first we needed an engineering solution. So you know, we have a Firewire camera, it looks at an infrared pointer. We went with the type of sort of

gesture metaphor that Dan was already used to with his talking -- with his speaking controller. And this is actually the least interesting part of the work, you know, is the design process. We needed an input, we needed continuous tracking. In the software, we look at the types of shapes he's making.

But then was the really interesting aspect of the work following the engineering part, where basically we were coding over Dan's shoulder at the hospital extensively to figure out, you know, how does Dan move? What's useful to him as an expressive motion? You know, what's his metaphor of performance? What types of things does he find important to control and convey in a piece of music?

And so all the parameter fitting and really the technology was stretched at that point to fit just Dan. And you know, I think this is a perspective shift. It's not that our technologies -- they provide access, they allow us to create pieces of creative work, but what about expression? What about that moment when an artist delivers that piece of work? You know, do our technologies allow us to express? Do they provide structure for us to do that? And you know, that's a personal relationship to expression that is lacking in the technological sphere. So with Dan, we needed a new design process, a new engineering process to sort of discover his movement and his path to expression that'll allow him to perform.

TOD MACHOVER: It's going to be looked at by this camera, analyze his movements. It's going to let Dan bring out all the different aspects of his music that he wants to.

DR. DAVID ROSE: Just want to stop to say, so this is a piece that Dan has composed in an instrument that I'll show you in a moment. But it's his composition, but now he's also conducting it.

TOD MACHOVER: When Dan makes music, his motions are very purposeful, very precise, very disciplined, and they're also very beautiful. So in hearing this piece, as I mentioned before, the most important thing is the music's great and it'll show you who Dan is.

[MUSIC PLAYS]

DR. DAVID ROSE: Just in the interest of time, I'm going to jump ahead.

[MUSIC PLAYS]

DR. DAVID ROSE: Look at the fabulous concentration. Here's what came out of that work, was a new kind of making music instrument which doesn't rely on bars and graphs and things, but by taking the shapes of music, putting them in a computer where they could be accessible to Dan, but actually more accessible to everybody. And out of this kind of work came Guitar Hero and all of the Garage Band and

all that kind of stuff. It came out of looking for what's a better interface than making notes on graph paper for creating music? So it begins to do all of these things. The only thing it doesn't do, because Dan didn't need it, is sort of how do we support his executive functions of planning? And that is another story we can get to in another, longer day.

I wanted to just mention, only a couple days ago I went back to the Glee site, where I found something that was much more personally relevant to me, which is it has a -- this is -- they have games you can play at the Glee site that are relevant to the show. They don't call them games. They call them extras. But one of them was a sing your own song in a -- what do you call it when you go to -- yes, karaoke thing. See, I need scaffolding. So when you go to a karaoke bar, you sing. But if you're like me, you would never go to a karaoke bar because you're not going to actually be on pitch and it sounds terrible.

Well, what I love is the Glee site gets that. The one that is great is it has the professional pitch correction that, as you know, professional singers use all the time. So it just says sing in here and then it says, okay, do you want to correct your pitch? And you go woop and, you know, I can sound fabulous. Okay, so for me, the ability to move into I can sing the song and I can get scaffolding on the pitch is fabulous. Just these things are available I want you to know.

Lastly, the third principle has to do with the most important thing, provide multiple means of engagement, a third principle. That's that third, central, core part of the nervous system. And I'm just going to read a few things to you. The guidelines talk about provide options for recruiting interest. Tons of research has been done here in this room on how do we recruit kids' interest? And there are such things as optimizing the relevance value or authenticity. We know what to do to make things more important to a kid. Another key thing is provide choice. Choice is a vital part of engagement. And school tends to not provide enough choice and so on.

Secondly, provide options for sustaining effort and performance. How do we keep kids performing? So then there are options, again from the research in this room, about how do we make the goals more salient so they're more sustained so kids can remember, why am I doing this at all? How can we use the social environment of a classroom to scaffold a kid to be able to sustain effort and persist? Because it's not just recruiting interest.

And thirdly, guideline around self-regulation. We don't actually want kids who are dependent on us to set up an engaging environment, or even on their peers and even on the kinds of clear goals that

would sustain performance. What we want are kids who are able to set good goals for themselves, to be able to regulate when things go wrong, to be able to sustain and handle frustration and all of that. This is hard stuff, but that's where we need to get because what we don't want are kids who are dependent on their school. We want them to be independent, self-advocates who know what's a reasonable goal for me and know how to monitor their progress and all of that. Those are the guidelines here, again from research largely in the room.

These things are all very developmental. And a book I wanted to highlight that's old, but that is fabulous, is called Developing Talent in Young People by Benjamin Bloom, the guy who did the work -- Bloom's taxonomy that you're all familiar with probably. Bloom did this wonderful thing about what kind of teachers you really need.

Oh, in fact this gives me an opportunity to say Bloom's taxonomy, people are not aware because the funding ran out. Just a caution to OSEP. The funding for Bloom's taxonomy ran out. He actually had three books planned. The first was about representation, the second was about action, and the third was about motivation and engagement. Who knew? I didn't know that till I went back and did the research. There was a third volume that didn't get published and I'm thinking, now that's the most important one. That Boom's taxonomy -- he meant to talk about motivation and engagement, those as critical to any educational environment.

So, but in this book he talked about, well, you need several different kinds of teachers. So I want to use my experience as a trumpet player to talk about these three kinds of teachers. When I was a beginning trumpet player, never played a trumpet, my mother really wanted me to learn piano, so she sent me off to a piano teacher. And I came home and I said, gee, I really want to play trumpet. And my mother, an absolutely gifted teacher, recognized that the right thing to do is look at the guidelines. Actually, I paraphrased all the UDL guidelines from my mother. She said, I've got to give little Davey some choice here.

So she bought me a plastic little trumpet that had four valves. You couldn't play anything that had more than four notes and they were just written out on the little pamphlet, and it cost $2.98. And that, she said, well, take that and have the music teacher do that too. So for three or four weeks, I did my real piano lesson, and for me, my real trumpet lesson. And you can imagine how horrified this music teacher was with this plastic trumpet and not even any notes or staves. Anyway, it must have been awful.

But, as it turned out, I liked the trumpet better even though it was stupid. And because, in fact, the teacher did the emotional part right, which is recognize, okay, this little guy, the important point isn't piano. The important point is music. I want this little boy to like music. And I'm going to do whatever it takes. If he wants to do that plastic, stupid trumpet, I'll start there.

So great, she followed all of these guidelines. Then the question is, how do I sustain this? Now I have to actually practice. The first teacher is all about emotion. The first teacher is how do I emotionally get a passion for this that I care about it? The second teacher is about technique. You actually need to learn skills to be able to do things. And so the second guideline is about how do we sustain? How can kids sustain so they can practice and get good at things?

And so there are some guidelines here. One is clearly -- the big thing for me was that I went and got in a band. The whole social thing of being in a band and having a girl I had a crush on and all these things were a really key part of sustaining the -- you got to practice every night. And all of that seemed awful at first, and then because I wanted to be a good player in the band, I'd practice and practice and there was other things I did.

Then I got to high school and we were in a competition. And my -- I practiced a lot and by this point I was the top trumpet player in my school. And we were in this competition and afterwards we didn't win. And the comments from the judge were specifically addressed and said, the solo trumpet has good technique, but lacks music. And I was stunned because it was so personal, that attack. And I was the best trumpet player in the school and I thought, how could I be bad? But later, my band director talked to the coach and to the judge and he said, he needs a new teacher.

So in Bloom's taxonomy, I'd had the first teacher, which got me to like music. My second teacher, my band guy, got me to do some technique so I could play a little bit. But now I needed a completely new teacher. And the third teacher is a tyrant, which is just an incredible idea for all of us. But I wanted to emphasize it because we often are accepting, especially of kids with disabilities, with okay. We've got to get kids with disabilities to not okay, to have a tyrant teacher about something that says, no, that's not good enough. That's not music or whatever it is that we want them to be good at. So the tyrant is the final teacher you really want.

So let me tell you what happened with the tyrant teacher. So I didn't know that this is what I wanted. I went to -- so I was given a new teacher, or suggested I go to this new teacher. I go to another part of town, never been there. And I walk in and he says, okay, play something for me. So I played my

best piece. It was fabulous I thought. And he just looks -- so I finish it. He looks at me and he says, do you play anything well? So that's the beginning of the tyrant teacher. I'm like -- and he says, I don't know if I'll take you. He said, you got a long way to go. You got a long way to go. He said, go away for two weeks. If you come back and you can play something, I might consider taking you. But he said, it's going to have to be twice as fast and twice as musical. I had no idea what the second part meant, but I knew what twice as fast meant.

And I started to practice two hours, then three hours a day because I was furious that someone would say I can't play trumpet, because I'd built up a lot. This was years and years. This would have been a horrible first teacher and a horrible second teacher, but a great third teacher. I came back two weeks later and I played it twice as fast. It wasn't really twice as musical, but he said, okay, I'll take you. Let's work on the music.

And so the next part was all about the music, which was fabulous. And just to brag, I ended up playing in Carnegie Hall and premiering -- I'm not going to play it. I thought of playing it, Aaron Copeland's Fanfare for the Common Man. And I was there at the premiere for New York state and I played a wrong note. It was so humiliating because Aaron Copeland was in the audience and I like ran out afterwards. But anyway, that worked in the end.

I want to stay here for a moment because music, its primary role is emotional. And here's a couple of quotes. Music mimics the dynamics of emotion itself. Music sounds the way emotions feel. The reason a composer, including Dan Ellsey, is writing is to make you feel something. So this is a really key thing. And I wanted to play another piece. This is Lady Gaga. We're getting to the good part of the talk for some of you. This the TV show Glee, which I had never seen before getting ready for this talk. A kid, of course, told me, watch the Glee cover of the Lady Gaga song.

So this captures in an emotional way, I think in a musical way, a large part of what I've been talking about and what I think we're doing, so I need to do just a little set up that, for those of you that don't watch Glee, Glee is about a group of people who sing as a glee club, but they're kids who are marginalized. They're not the cool kids. There's the social kids, the really cool kids are another group. These kids are outsiders for some reason, and they've been brought together by their singing. And you'll see they're going to show you what it is that feels not right about themselves. And you'll see things like Nose. And that -- everybody who watches the show knows that she's been wrestling with a nose job. She wants to look better. And another one has trouty mouth and it's like he's embarrassed about the

way his face looks. There are people with disabilities. There's everything. Watch how rich the texture of this is. Lady Gaga's Born This Way as done by the Glee.

[MUSIC PLAYS]: It doesn't matter if you love him or capital H-I-M. Just put your paws up because you were born this way, baby. My mama told me when I was young, we're all born superstars. She rolled my hair, put my lipstick on in the glass of her boudoir. There's nothing wrong with loving who you are, she said, because he made you perfect, babe. So hold your head up, girl, and you'll go far. Listen to me when I say I'm beautiful in my way because god makes no mistakes. I'm on the right track, baby. I was born this way. Don't hide yourself in regret. Just love yourself and you're set. I'm on the right track, baby. I was born this way. Don't be a drag, just be a queen, whether you're broke or evergreen. You're black, white, beige, chola descent. You're Lebanese, you're orient. Whether life's disabilities left you outcast, bullied, or teased, rejoice and love yourself today because baby, you were born this way. No matter black, white, or beige, chola or orient, babe, I'm on the right track, baby. I was born this way. I'm on the right track, baby. I was born this way. Don't hide yourself in regret. Just love yourself and you're set. I'm on the right track, baby. I was born this way. Ooh, there ain't no other way. Baby, I was born this way. Baby, I was born this way. Ooh, there ain't no other way. Baby, I was born this way. Right track, baby, I was born this way. I was born this way, hey. I was born this way, hey. I'm on the right track, baby. I was born this way, hey. I was born this way, hey. I was born this way, hey. I'm on the right track, baby. I was born this way, hey.

DR. DAVID ROSE: I need to tell you an inside joke. The last woman who bares herself as Lebanese, it's actually a mispronunciation that other kids have done in making fun of her. It's lesbian and they said Lebanese. She's trying to decide if she should come out as a Lebanese.

The last thing I want to show is a fabulous book that I discovered only in doing this talk. It's brand new and it's called Extraordinary Measures, a wonderful pun. And the author is Straus, S-T-R-A-U-S. And its subtitle is Disability in Music. Gorgeous book. One of the best books I've found in years. It has a UDL message that's unbelievable. The first two-thirds of the book is musical narratives of composers with disability. And what I love, he starts with Beethoven, talks about Beethoven's Eroica. And you know what? Beethoven's Eroica was written -- some people think it's about Napoleon, but he digs up the evidence to show it's very clearly about Beethoven coming to grips with his deafness. And what is the heroic struggle is figuring out I can make great music and be deaf. And it's just a fabulous exposition of this.

So, Beethoven. Bach was blind. Schoenberg, blah blah blah. All of these composers, the great pantheon of American musical literature, had disabilities. It's a fabulous way to just say, and let's look at it. How does it get expressed in their music? Look at these for chapter titles. The last two chapters are called: Performing Music and Performing Disability. Wow, what a title. And the next one: Prodigious Hearing, Normal Hearing, and Disablist Hearing.

And what these chapter are doing is richly upsetting the apple cart. He'll take some of the things I've done here and he'll say, for example -- I'll just use one example, perfect pitch. Some of you probably know the incidence of perfect pitch is much higher, very high in individuals with autism or individuals with Williams syndrome. Perfect pitch is a way of hearing that is part of a great spectrum of hearing, but we have narrowed our focus to relative pitch because that's what most of us have. And what he's showing is that we've lost something by not including all of those people who had a different part of the spectrum, this perfect pitch. And he says music is lost for it. It's a fabulous argument. And normal hearing he takes as too narrow. And he talks about disablist hearing as adding dimensions to hearing.

I just want to -- I'm near the end of my talk, but I just want to read a couple of the quotes because he writes so beautifully. I know this is breaking the rules to read to you, but he writes beautifully. This is talking about Glennie, the percussionist who's deaf, which is -- she's always an appealing figure. Because I had to concentrate with every fiber of my body -- remember she's deaf -- and brain, I experience music with a profundity that I felt was god-given and precious. I didn't want to lose that special gift.

This is her website. I like what she says. She's a musician, a motivational speaker, composer, an educationalist now. She likes to talk to kids about music and deafness. Glennie's deafness has shaped the way she makes sense of music and produces music, causing her to attend to the tactile and visual aspects of sound. She sees and feels the music. She's doing multiple representations. She's seeing a richer spectrum of what music is, which is fabulous.

By attending in her performances to the sights and feelings of the sound she hears and produces, she performs barefoot and with extraordinary visual intensity. She makes her deafness visible to the audience, simultaneously performing her music and her deafness. What a beautiful line. Disablist hearing is part of a larger effort within disabilities studies toward empowerment, in which an oppressed and silenced group begins to assert the power of self-representation. Instead of trying to normalize people with disabilities, we listen to what they have to say. Instead of turning them into normal hearers, we learn to hear in ways that challenge normal hearing.

My essential point is that the range of human hearing is wider than generally recognized. The boundary between normal and abnormal hearing is a construction, a fiction. And he talks about it historically. We cannot begin to dismantle that wall until we define better what lies on either side of it.

I want to get back to my point about universality, where I began. False claims of universality are the least attractive feature of the literature on music cognition, which moves too easily from showing that something is widespread to asserting that it is therefore normal, natural, and hardwired into the human brain. In fact, there are many kinds of bodies, many kinds of brains, and many kinds of musical hearing. In our theorizing and in our pedagogy, I think we would do well to acknowledge the limitations of normal hearing.

So the last stage for me is realizing that the reason that we work with people who have disabilities is because we want to reform education for everybody. And it's that work that you have all done for years and years and years that will make education better in the same way that Glennie talks about. If we really listen to people with disabilities, we will get to a better music, not just disabled music.

And just to close, I want to -- this popped up on my radar screen too. This is the Glee cast. You may recognize them. They're now going to meet a school for the deaf. They're in a singing competition and the socias, the cool kids, have made fun of it, like how can deaf kids -- what is that? They can't -- why are they there? They just honk literally it's said in the show. And the -- you'll see the Glee club, remember who are kids who are used to being marginalized, they're sitting, they're listening to their deaf colleagues, who are about to sing -- the reason I wanted to end it because I want to end with a Beatles song, so this is John Lennon's Imagine.

[MUSIC PLAYS] : Imagine there's no heaven. It's easy if you try. No hell below us. Above us only sky. Imagine all the people living life for today. Imagine there's no countries. It isn't hard to do. Nothing to kill or die for. And no religion too. Imagine all the people living life in peace. You may say I'm a dreamer, but I'm not the only one. I hope someday you'll join us and the world will be as one. Imagine no possessions. I wonder if you can. No need for greed or hunger, a brotherhood of man. Imagine all the people sharing all the world. You may say I'm a dreamer, but I'm not the only one. I hope someday you'll join us and the world will live as one.

DR. DAVID ROSE: I hate it that Glee gets it better than our schools. So I just want to end that I think the point of Universal Design for Learning for sure, and all of the work that you do, is -- I think is best embodied in recognizing the limits of normal education. We aren't trying to make normal education

accessible to kids with disabilities. It's a disabled kind of education. It's a narrow kind of education as it is. Kids with disabilities will show us how to make an education that will work for everyone. And we need to include them. Overcoming those limits will make education better, and I would say more musical, for everyone. Thank you very much.

NARRATOR: Let's take a moment to summarize the main ideas in this presentation. Learner variability is universal. The context within typical learning settings is limiting and disabling. Universal Design for Learning helps educators meet the challenge of variability. Learners who are disabled by typical learning contexts will show us how to make an education that will work for everyone.

Thanks for joining us for this special presentation on Universal Design for Learning. You can learn more by downloading materials in the resource section and by going to the National Center on UDL. To ask Dr. Rose a question or to share a comment with him and the UDL community about this presentation, participate in the discussion forum entitled From Bach to Lady Gaga in the UDL Connect community. Please join us again as we continue to add new sessions to the UDL series.