DayTwoKeynote

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SPEAKERS

Jane Waite, Ethel Tshukudu, Dr. David James

Ethel Tshukudu 00:00

. . . songwriter who focuses on the intersection between art, music and computing, he has built courses that infuse Black music, which are aimed at representing underrepresented computer science students. Please help me welcome him as he talks about using culture as a bridge to reach our students. Feel free to write your questions in the chat as he's talking. And I'll present the questions to him at the end of the session. Thank you. Over to you, Dr. James.

Dr. David James 00:38

All right, I have to say, um, it is an absolute pleasure and an honor to be here speaking to everyone that's in attendance. I'm just getting my screen shared here. And we will, we will get going. Um, the first thing that I I want to do and that I want to emphasize is that it's very important, I think, as an as an educator, and someone who studies education for the folks that are in the room to form. So, what I'm going to do is I'm actually going to post a couple of questions, I'm going to maximize my screen here, so that you can see, and I'm going to have you answer those questions. The second question might make you feel a little bit uneasy. You don't have to answer that question in the chat. But I would like you to answer the first question. Place the answer to the first question in the chat. Just take a couple of minutes to do that. And as we go along in the presentation, I'll kind of clarify why it's important for you to link to those. I'm not touching that. We don't see the screen. are you sharing the screen? Oh, hold on. Let's see here. Okay. Okay, can you guys see my screen now? Yeah, okay. Yes. So um, what I'd like for you guys to do is go ahead and answer the first question that you see there. You can keep the answer for the second question to yourself because I realized that might be a little private, make people a little uneasy. But as I said before, I think it's important to establish a little bit of community when we have people gathered in a room so just take a couple of minutes to do that for me. Yes, oh my gosh. jollof rice I'm already seeing some stuff rolling the chat. Oh my gosh. Give me Let me see what else is rolling into this chat here? a plate of rice and fish My gosh, that sounds good. Oh, Balinese? That sounds awesome. [inaud] fish. Oh my gosh. So I am I am actually allergic to fish. But my family. One of the dishes that they love to eat is roast fish. So taking the fish season and in and roasting it. Um is an absolute treat. Right. So there are a couple of reasons why I've kind of asked you this question of what was the last good meal that you've had to eat. And, and I put emphasis on good. Um, there's something

about food. I think when we eat food, we create community is one of those things that gives us comfort. And it calms our spirit and, and allows us to create bonds and ties with people. And it's one of the things that that we never forget. And I want to highlight just a little bit how easy it was for people to remember what their last good meal was. And not just something that we just throw in our mouths just to keep going, you know, we're in between zoom meetings, and we're trying to keep ourselves refreshed. So we just throw a little snack in our mouth, and we keep going, I'm talking about a good meal. Um, so the reason I bring this up is because food is one of those things that allows us to bet bound, you know, create bonds with other people. And it's one of the things that we share about ourselves and about our culture with other people. And what I want to do is share with you a little bit of my story today, just so that you know a little bit about my culture, and how I go about helping to use that as a bridge with students that are in my classroom. So I'm originally from Brooklyn. I'm from Brooklyn, New York City. And I think it's important important to give you a little bit of context, on Brooklyn, Brooklyn, New York City where I grew up, there was an absolute melting pot of cultures. You have folks that come from the West Indies, you have folks that come from all over the continent of Africa, you have folks that come from all over the world, and we come together and we celebrate each other. When we have, when we get together, we have block party. So we go out in the street, we go out in the parks, and we listen to music. We have food like this available. This is this is actually the last good meal that I had, which is a is called curry chicken. So it's chicken, seasoned salt, pepper, Curry, and, and his rice and cabbage that goes along with that there's a beef patty this up there. So there's this mixture of food and music and sound. Okay. Um, and that's the environment in which I grew up. My dad was a DJ in the 70s. So he had a record collection in his basement. And he would play music all the time when we were in cars, and we would take long drives, places. So, one day, my, my aunt, or his sister decided to she knew that I love riding with him and listening to music. So she took me to a talent show in high school. Um, when I went to that talent show, I saw some guys get on stage, and with no music. They sang on two songs they sang ended a row from Boys to Men. And I believe they sang if I fall in love by our group bot called shy, and at that very moment, um, that was the first time that I had fallen in love. Like I was, I was very young, I never experienced love outside of the context of a relationship before I noticed sounding very personal. But I fell in love with something and I knew what it felt like to be attached to something for what I thought was the rest of my life. And my, my mom saw fit to buy me a Walkman. I know for some of the folks in attendance, they might not know what this thing is. But literally, I had a tape had that that tape that I listened to from that talent show. And it was a single so I only had one song on the tape, so I'll put the tape in there to that Walkman I will press play and as soon as it finished plan, I would turn it around. So every song I had to turn the tape around in there and I played that tape until I could physically feel the Walkman get warm in my hands. So that was the first time that I have fell in love. Um, and we're going to fast forward a little bit and we're going to enter grads School. So as I went along, um, I, in high school, I became a part of the performing arts group who saying, I became a person picked up an instrument started learning to play and record songs, and I got to grad school. Because I wanted to learn how to teach. And I started doing some research in order to, you know, just get by and make sure I had the bills pay while I was in grad school. And I was speaking with one of my cohort mates about my research, and it was something it was a project that was just available for my advisor. And I said, Yeah, it's doing this research that I've been doing, and I've been using to kind of keep the bills going, um, and my cohort meet said, um, you're going to be doing this project for a long time. Why don't you pick something that you're in love with. And I that was, that was a moment where I really had to sit down and think about this. So to this point, I hadn't really engaged on

the part of my my brain, in my grad school journey, right, that provided some of these indelible memories that I'm never going to forget about where I came from. Some of the things that serve to make me who I am and serve to make me appreciate the things I appreciate as a person. So from that point on, I made a promise to myself, that the things that I love, the things that are part of my culture, are always going to be a part of my work as a researcher, and are always going to be a part of my work as as an educator as well. So now, I had to go on and figure out how music, how Black music, r&b, hip hop, and computer science actually go together. So I know the first time that I typically give these types of talks to people. They tend to look at Black music, and they tend to look at computer science. And then quickly what follows is this. Right? So how exactly do these things go together? And it's also a question that I had to answer as a researcher. So how exactly Can I make the study of computer science go together with hip hop? And why is it something that I want to do? Well, just a step back, through my childhood and through my culture, I started to realize that these things that I never forgot about, were actually the lens that I was using to view information, these experiences that I had. And these things that I had been through weren't just simple moments and time, they were literally the lens in the view that I was using in order to interrogate information, and to be able to see what resonated with me and would stay with me as a person. So, so figuring out the interconnection between these two symbols, these two seemingly disparate, disparate things, it wasn't just a research question, but it was really a path for me forward to figure out how am I going to connect the things that I know with computer science with myself, because as I was going through my computer science courses, we've all seen that the the temperature converter example, we've all seen on the example of you know, doing the first Hello World program, and I'm going to be honest with you, as a student, especially a Black student, who went to a primarily went to a primarily white institution. I sat in those classes and those things never resonated with me as a person. I was never able to hinge on to some of those examples that I saw in class, because I wasn't able to see myself in those things. So tackling, tackling this connection and being able to communicate, it was something that I had to do. So one The first things that I did was I took on I tried to take on the challenge of figuring out, how can we incorporate music and use it as a tool to teach students who have never used programming languages before? About how to write basic programs? How do we use this as a tool to teach them about loops? How do we use them as use this as a tool? In order to talk through arm, how to sequence things in a program? How do we use this as a tool to talk to them about functions? Okay, so what I did was I look back at hip hop history. And one of the things I love about hip hop is that it's the story of America. It is literally the story of of New York, the story of immigrants coming from outside of the United States and bringing their culture here to start something new. So for those of you who don't know this person who's on the sly, his name is DJ Kool Herc. Um, so DJ Kool Herc actually came here from Jamaica. He was very involved in a sound system culture. In Jamaica, sound system culture was all about folks literally having a Block party. So bringing speakers out to the street having a party industry and seeing who was able to move the crowd and motivate the crowd the best amongst the people who were at the party in the streets. So, um, hurt was a regular. He went to school, hurt had a sister and his sister had friends. Um, so what his sister wanted to do was have a party before school started. Um, so she invited she invited her friends to come over to 1520 Sedgwick Avenue, which is the place where hip hop started. And they charge 10 cent for admission for guys. It was actually a nickel for gross. And they partied all night with just a crate of 20 Records. Now I presented this as a challenge that Herc encountered, he had 20 Records and he literally had to play all night long. How what tools what exactly did he have at his disposal to be able to make this thing work? So then I introduced to my students the concept of a loop so so Herc would take

some of the records of his day. And he would, he would take some of the bits of the song that move people the most when they were dancing. And he would loop those, those pieces of the music to keep it going and stretch the songs out so that they would last all night. Okay, so that was the spark for me to see that there are parts of songwriting, and there are parts of music that are tied together with computer science, if we look at computer science as a way of interrogating the world, with the computer as a system that we can use in order to test our theories, okay? Because the act of looping is something that is central to computer science and black music. If you listen to songs, you hear pieces of the songs repeat all the time. And this is a process that we use, as developers and as educators to educate. And also to write software. That's good. We reuse code. That's what we do in order to build better systems that don't have green code in them and to be more efficient in our problem solving, just like hurt tape when he started hip hop, what again, what I interrogated was okay, so if he was using a loop to solve problems, okay, what exactly was he putting into the loop? How exactly was he able to use this record player as a tool on the record player is very simple. record players allow you to start a piece of music that allows you to stop a piece of music, and it also allows you to mix and loop pieces of music. Okay, so what I did for my students was, I introduced them to another piece of technology called the drum machine. So the drum machine is actually a small simple computer that can be programmed to play a limited number of sounds. So hip hop producers will also take these sounds from record players. And they would actually load them into these drum machines, and be able to touch these square pads that we have here to have them reproduce different parts of the records. So literally, it's a, they went through a process of taking these sounds from record players and storing them into the memory of a computer, and then programming the computer so that it ordered the samples in a way that made a new song. Okay. So if you think about it, order is something that's very, very crucial to us, as educators and programmers and building builders of software to communicate to folks that we're trying to teach so this was another piece that I was able to extract from the music making process in r&b and hip hop as a teaching tool. Um, and what I had my students do was, I actually gave them a few samples. So I gave them a few samples that made a song. And I told them, I wanted them to rearrange these samples. First, we're going to use these samples first to reconstruct a song that they already knew of. And then what they were going to do was use diagrams diagramming tools, okay, in order to tell me the sequence of the samples so that they can make a remix. Okay, um, this is from this is actually from the first time that I use this technique in order to teach programming order. So the sample is a bit outdated. So I hope you forgive me for that. But what I literally had the students do was I had the students listen to the instrumental Hope you guys could hear that. Um, and then what I had them do was listen to the actual pieces, or the samples, right, that made up the song, and had them identify which piece is almost like backtracking through a recipe, which ingredients were used, and what were the order in which they use these ingredients in order to make this final product that was the instrumental so I'll play for them each sample and ask them, Hey, what was the first ingredient. So I'll play those samples for them. And then they be able to identify that this was the first sample or the first ingredient in order that was used in order to make this instrumental. Okay, and now what I have them do is listen to the song, and then identify where the samples repeated. Okay. So what happens next, if you listen to this long enough, as you'll hear the next sample? So we stopped this, and then I say, hey, what was the next sample that you heard? Was it this one? No, wasn't that one. It was this right? Now, I can ask them how many times they heard that sample repeat. And I can introduce them to the concept of a loop. Okay, and and show it to them as a problem solving concept that helps to make your programs more efficient. I'm not going to write this block four times, right, I'm simply going to write the block once and then tell the computer

how many times they're to repeat the execution of that sample. So we went through that process over and over again to reconstruct the song. And if you listen to the song, The beautiful thing about hip hop and black music, is that it gives us the tools to talk about complex issues. problems for introductory and advanced programmers, if you listen to song songs actually have a structure that will have a nested loop. Okay, so typically, you'll hear something that repeats in a verse and it'll go to a chorus, which is the, the salt part of the song that you repeat. And then after that chorus, you're going to go back to a verse. So in that song writing structure, so this is American songwriting, if we go all the way back to the blues, they use this same repeating song structure in order to write songs, okay? But it's a useful tool to allow the students to naturally understand what a nested loop is, and why it might be useful to use that in a program. Okay. So after showing them how to reconstruct a song, what I did was, I would present them with some samples, and ask them to rearrange the samples that in a way that would make a remix. So I would tell them, they're supposed to have at least four samples in their song. And then at least two of the samples have to be looped a number of times. So, um, this did two things. So number one is allowing them to quickly be able to deal with some programming concepts without having to whip out the compiler first, number two, the students are able to get an immediate arm gratification. So once this is in PowerPoint, right, so as they order their stuff, they're able to go through the process of actually clicking each block. And debugging their program by seeing if it sounds the way that they want it to write. So I haven't even gotten into a debugger, I haven't gotten into code output yet. But the students are iterating through their final product by rearranging the blocks and clicking on them in order, so on and so forth. And not only that, um, I do this, when I do this in class, what I do is I ask my students, what are your favorite songs, and I'll put those songs into the PowerPoint slides and chop them up into samples. So when they hear those songs, they automatically get that link to memories that they've had when they've heard their favorite songs, or where they were moments that made them dance when they heard a song that resonated with them, right? So we're not just talking about computer science concepts, but we're allowing them to see their lives in the material that we're teaching. Right. Okay, now, why is all of this important? So one of the things that I realized along my journey in grad school and along my journey as a researcher, is that your story is your only weapon. The only thing that really makes you different from other people, is the sum total of your experiences, and what you've been able to learn along the way. Right? So the same is true of our students. Right? So our students, if I'm able to go back some slides. Remember, I asked you about what was the last thing or experience that made you fall in love. There's a movie called brown sugar arm that I've watched some time ago, and the two main characters are two musicians or people involved in hip hop, and they sat on a park bench or wax nostalgic about their childhood, and asked each other, actually, the the, the female protagonist asked the male protagonists Dre, Dre, do you remember when you fell in love with hip hop? Right? And and when, when he responded, it was something that was instant. So if you ask yourself the question, what was the last thing or experience that made you fall in love? Right? It should be something that relative it sparks your mind and sparks your curiosity, you're able to pull out what that experience is. And what I'll tell you is each of our students are able to do that too. And if our students aren't able to see these images, right, these experiences that they've had indelibly imprinted in their brains and have them resonate with the way that we teach. those lessons that they that we teach, will not be indelibly imprinted like these images, they're just going to wither away if they don't register Right, just like that temperature converter, or just like the Hello World program, right? Because these images, like I said before, at the beginning of the presentation, these are the lenses through which our students interrogate knowledge. And these are the glasses and and, and their vision that they use in order to

process information on and have it stay with them. So what I'd like you to know, is that I haven't stopped with this connection between black music and computer science. It's also something that I've used to teach students about data structures. So what I'll do is I'll have the students make a song object, what so what are the the pieces of information that we store in a song, and I can guarantee you, every student has, or every student has some source of music that they listen to. So I'll pull out Spotify, or I'll pull out Apple Music, and I'll have them take down two pieces of data information that that we use that they use in that program in order to represent a song, and it's right in front of them. And if you think about it, nowadays, we're talking about big data, right? That's the big, that is the big thing that hovers above Computer Science at it right now. And if we think about songs, right, let's take one song, they had to invent compression to allow songs to get transferred over the internet, right? So it was one of the data problems that we've been dealing with for a long time. And we've come up with solutions to CD quality audio, if you take a look at just at just one song you're looking at, you're looking at about 44 megabytes worth of data just for one song, right? So I look at my Spotify playlist, and my life playlists got about 700 800 songs in it. Okay, so music is data. Right? And the one thing that I want you to take away from this, right, is that music is the data that resonated with me. Right? And that these experiences that students have, right? Are the data that matters to them? Because they matter. Right? So as computer science educators, one of the things that I had to realize and that I had to tackle as I was working my way into my graduate study and working my way into my work is a educated cater is that data is not neutral, right? data packages, our experiences and our ways of looking at the world. So we have to be intentional about finding out what these things are for our students and building them into our courses. So that they resonate, and so that they stay with them and don't fade away. But have some permanence like these images. So what I'm going to do is I'm going to take some time, we have a little bit of time left, I believe. And I would love to answer some of your questions that you may have folks in the audience who just listen to the presentation feelings that you may have ideas that you may have with me, and I thank you so much for your attention during during his keynote.

Ethel Tshukudu 33:44
Thank you so much, Dr. James. This was really interesting to listen to. So we have a comment from amber Hussain that I've always felt like hip hop pedagogy could be a super interesting way of combating defensive climates in CS classrooms. Mm hmm. Yeah. And then we have a question from Kalia. Which is, what are some [inaud] stories that you can share about how your curriculum has impacted them?

Dr. David James 34:25
Okay, so, um, hi, Kalia. Kalia. Um, I just want to put the spotlight on her a little bit. Um, because Kalia does some impactful super impactful work in teaching young scholars in color about the power of technology to power of computer science and the power of programming by sitting with them and workshopping with them to create products by using programming languages. So I'm so honored that you came and saw the top scholar story To share about how my curriculum has impacted them. So when I first developed this way of using samples to teach programming, I had a student walk up to me. And the student had just seen a talk that I given. And the student told me that he hadn't really connected to computer science before. And not only did that generate an interest in computer science for him, but it also made him more confident in his ability just to create. And I think one of the things that I love about this is that it also opens up this world of creativity to students, and opens up the

possibilities for them to create new things with computation. And I think that was one of the things that was alluring for me and my path. So in high school, we had majors, oddly enough. So my major was actually media communication. So it showed me that the computer can be used as a creative tool, and I was a spark for me to go forward and figure out how can I use my computer as a songwriter? How can I use my computer as a programming or create new things, and then opened up my eyes to this, the concept that really creativity and programming are not different? They're really one in the same. They're ways that we express ourselves and problem solving. But it's just us that a lot that is us, is this us as people who choose the context of our program, problem solving, what problems are we going to solve, because we can solve any problems we want, we just saw problems around hip hop, we can solve problems around Black Lives Matter, we can solve problems around black music, or we could solve problems around climate change. It's up to us to choose the context of the data that we're choosing to attack and present students when we go about solving problems. So that's one story, I had a story. I have one student this semester, my data structures class tell me that if I didn't use some other sorts of data other than numbers, or maybe just some strings, that she went and stayed interested and checked in this semester, especially during pandemic, when we have so many different things pulling at us, when people get sick, possibly in their households or in a community, you know, folks are all coming together inside the house, it's not just a dorm room anymore, people might be in a house with their family and folks are running around and doing schooling. So this helps her to stay focused and keep her attention because she saw that she was able to produce something with her program that was a value to her that she could see herself in. Thank you very much kuliah for that question. Yeah, um, [inaud] also is kind of like commenting, as well as asking me a question or you know, any pedagogy that resonates with students who will likely encourage their learning. So they wanted to find you to have more work like published work that confirms that there's via some empirical results. Yeah, so what I've done is I've captured on, I've captured the feedback from students through web surveys. So I've taken a look at two different groups of students, over two different semesters, I'm using these approaches to teach a couple of things. So one was the data structures course. And the other course was an introduction of programming course. So the respect paper actually looks at the sample rearranging approach that I talked about. And there's there's an idiocy paper that talks about using on DJ and so on, so using arm so having students build drum machines and DJ controllers, as a means to having them understand how music can be used as data and data structures. In short, if you think about it, you could use a cue as a playlist. Okay, or you could use a link list is a playlist, or you could use an array as a playlist. So if I want to remove a song from my playlist, would it be more efficient to do that with an array or a linked list? Right? If I want to capture the history of the songs that the DJ is playing, what would be the best data structure to do that? Why would I use a stack to do that? What I use a queue would I use a linked list right? A stack naturally will be the best choice because it puts the last record I played on the top right, so it um, so there's, I have those results in the idiocy paper and you'll also see the feedback from the students in that paper as well. In the first paper in a respect paper on it actually looked at of course that non majors took and about 67 or 68% of the students were interested in taking In future computer science courses, even though they weren't bound by their major to do so. So just enter entering that cultural component and allowing the students to see that they could be a part of the curriculum materials really made them interested in computation just as a skill, and also giving them the ability and the agency to create. I hope that answered your question. I think it did. So this one is really interesting. I think I was also thinking about it from Elijah, do we ever run into situations where students are not as connected as you think they add to the couch chair or bed bound? You know, and, and, you

know, some some of them might feel left out during class? How do you handle situations like that? That's a good question. So um, pandemic was kind of tough. Um, so for my school, I'm at Spelman College, we actually had a reduced schedule. So we actually went from 15 weeks to 11. And we took out the, the break that the students had in the middle, typically, what I'll do is for the data structures project is a project that's broken up into multiple stages. And the students will actually have the opportunity to make their own data structures project. So I'll ask them to propose a problem that they would like to solve, right. So this serves to have the students bring a problem that's important to them to the table, and then think about how to use data structures, and also how to use object oriented programming in order to solve that. So I give the students a choice. Typically, when I don't have like a condensed semester, I'll give the students a choice between proposing a project that they would like to solve, or I'll have like some music projects on standby for them, like making a drum machine or making the DJ controller, right. Um, and that allows the students to kind of stay engaged with something that they find interesting. Now, they might be a little bored in between, because I use music a lot in my teaching examples. So instead of having lists and arrays of numbers, I'll have lists and arrays of songs, so that they can hear the order and sequence of the songs. And what I find is that it makes it a lot easier to know when students code is working. Because when I'm in the same room with students, I could already hear the people that are getting it because I'm hearing sound and noise from their computers. And I know where to kind of focus my attention. But that is a problem that, well, it's not really a problem. People have diverse tastes and wants. But what I try to do is I try to operate from my lens and my perspective, and I hope that my passion and enthusiasm for computer science and culture kind of rubs off on my delivery of the content. And then I try to give the students additional options in terms of the problems that they can solve in a class. Thank you. Jane, I don't understand your question. Do you mind unmuting yourself?

Jane Waite 43:16
I don't mind tool. But I have to be absolutely honest. And say that I was in a lab teaching undergraduates up until not very long ago, if I've missed the beginning. And but I just wondered, and I've read your paper before and I was desperately trying to remember to recall where it was. So I'm really I really liked what you're doing. But I just wondered whether there's an issue of authenticity in terms of thurs instructors, who are not familiar with contexts. So if you have people presenting context and material, which is they have no clue what they're talking about, do students sometimes respond poorly, rather than neck? You know, I just wondered if anyone's done any research on that? I'm sure there must be some out there. [inaud].

Dr. David James 44:08
Yes. So so there is definitely some research out there about a, I'm trying to think about the exact verbiage on let's talk about thickly authentic experiences in a classroom and how it helps on the content to resonate amongst the students. But what I try to do is I try to use my passion and my experience and my culture as a starting point.

Jane Waite 44:36
The What I'm saying is that's appropriate for yourself. But in the classrooms where you have instructors where it's not they're culturally connected experience. How do we bridge I know it sounds awful, but

how did they whoever bridge that gap, without it feeling almost lost? Cultural reappropriation, you know, about it not being authentic?

Dr. David James 45:06
Right, right. Well, the the way that I would approach it is, well, one of the first things I like to do with my students is I like to ask them, I try to get an answer to the second question in the slide. And I try to bring to them things that are authentic to me, that helps to that, that that gives some overlap with the students. Right. So there are, I saw a whole lot of people talking about food in the chat and food is is one of those things that we we bond over, right, and we can create connections with, right. So I think that you'll find, you know, just having authentic conversations with your students will serve to show you some areas where there's overlap between you two, right, and then you could use that as a jump off point for some of the curriculum materials that you use. Now, this is harder when you have instructors who aren't the lead instructors, and can't pivot on a dime. So what I find is useful is, is also having maybe a box of projects, a digital box of projects that span some commonalities that people like. So food, and music could be one of them. And you could think about some others, some other areas of overlap with students, but you have to start with a place that's authentic between you and the students or work. And Has anyone done any research on that? I think that's what I'm interested in is, I know, I'm an edge. I wasn't educated for a long time, and I don't care, I'll do whatever is needed. But I wondered if that is, if that kind of thing of putting yourself out there and finding those overlaps? Whether that's common, so I'm just trying to find out get a feel for where the barriers are. So So the answer to your question is, yes, I can see the papers in my head, I'm just not remembering the author. So if we connect offline, um, I don't know if I've put my contact information here. But, um, I will try to send you that paper that I've seen, and I know that we'll have some links to others as well. Um,

Jane Waite 47:17
and the reason I ask is that we're doing a piece of work here in the UK. And one concerns me is the about finding the overlap and having evidence that teachers can find something without it being too. False.

Dr. David James 47:38
Right, but but yes, I agree. So what I'm just trying to highlight is that we as educators are people to write so we we, we have our things as human beings that just resonate with us computer science aside, right. So I'm just asking people to interrogate that piece, you know, and bring that with them when they step into the classroom, because I think some education, educators might have a different perspective on that and say, Hey, I need to kind of maintain a level of distance that might not permit that. Right. So but But absolutely, I can shoot you some papers that I've seen on that topic. And let me just put my, my email address here.

Jane Waite 48:20
It's really subtle, isn't it? It's not, it's about overlap, as opposed to matched.

Dr. David James 48:29
That's right. That's right. So while some of the food items that you had posted aren't, those aren't food items that I can cook, right, but I can certainly appreciate your connection to those things. Right. So my

thing is that the projects that the students work on in my class, they're not all projects that resonate with me, but I have the ability to step them through object oriented programming, right, and designed to help them structure their project in a way that's going to work. Right. So we're just using their passion as a context as a problem space. But these techniques that we know is computer science, can be applied to that without us having to, to, without us having to be the people that are experts about that, right. We can always talk about. We could always talk about encapsulation, we could always talk about, um, we could always talk about Big O analysis, we can always talk about these things separate and apart from the actual things that are in the data structures, right, in terms of their significance and culture. But I think what we have to do is allow the students to bring that part of them into the class.

Ethel Tshukudu 49:47
Thank you so much, Dr. James, and thank you for sharing your email address.

Dr. David James 49:52
I Oh, hold on. It's actually D James 18. So if you wrote dl Dave's, I have some odd email. addresses because my name is kind of common.

Ethel Tshukudu 50:02
And we know we can find you on Twitter as well. Yes, yes. Yes.

Dr. David James 50:07
So I'm at, um, I'm at David L. James, on Twitter.

Ethel Tshukudu 50:15
Yeah. So this was really interesting and the questions were amazing and the answers were amazing and I just want to thank everybody who participated in this session.