Transcript - Strategies for Success: Carrie Diaz Eaton

2/9/2024

NORMA HOLLEBECK: Welcome to the Every Learner Everywhere Strategies for Success webinar series for 2024. It's a pleasure to have you with us today. My name is Norma Hollebeck, and I'm the senior manager for network programs and services at Every Learner Everywhere. Before I introduce our guest speaker, I'd like to take out just a few minutes to tell you about Every Learner Everywhere and the mission of our network. Every Learner Everywhere is a collaboration of higher education organizations with the expertise in evaluating, implementing, scaling, and measuring the efficacy of digital learning and its integration into pedagogical practice. Every Learner Everywhere is sponsored by the Bill and Melinda Gates Foundation. And here at Every Learner, we work with colleges and universities to build capacity among faculty and instructional support staff to improve student outcomes with digital learning.

Our mission is to help institutions use new technology to innovate teaching and learning with the ultimate goal of increasing student success, especially for first generation college students, poverty-impacted students, and racially minoritized students.

A quick housekeeping note. Throughout the presentation, we welcome your questions in the Q&A section found in the Zoom toolbar. If participants raise their hand, however, we will not be able to unmute you, but we will be monitoring the Q&A section as well as the chat.

Now, to get to our guest speaker. I would like to welcome Dr. Carrie Diaz Eaton. She is an associate professor of digital and computational studies at Bates College. Diaz Eaton's degrees are in mathematics, and their research is grounded in approaches for complex adaptive systems in evolution and ecology.

They were a co-founder of QUBES, Quantitative Undergraduate Biology Education and Synthesis, and the project director for Math Mamas. Dr. Diaz Eaton currently serves as the chair for the Committee for Minority Participation in Mathematics for the Mathematic Association of America, on the editorial boards for PRIMUS, Problems, Resources, and Issues in Mathematics Undergraduate Studies and CourseSource.

And is MAA values leader and leads the institute for a Racially Just, Inclusive, and Open STEM Education, the RIOS Institute. During the 2022-2023 academic year, Diaz Eaton was on sabbatical as a visiting researcher at the Institute for Computational and Experimental Mathematics at Brown University and the Institute for Mathematical and Statistical Innovation at the University of Chicago, where they were organizing programs for social justice research and data science.

Dr. Diaz Eaton values the complex interplay at the intersection of her identities and professional activism in STEM education, research, and teaching. A link to their full biography and select publications can be found in the link in the chat. Please help me in welcoming Dr. Carrie Diaz Eaton.

CARRIE DIAZ EATON: Thank you. Thank you so much, Karen. Thank you so much to Every Learner Everywhere for having me today to talk a little bit about some of the things I do in my work and hopefully some ideas that folks are interested in, maybe thinking about how this might be adapted to their own institutional and teaching challenges.

I've been seeing everyone introduce themselves on the chat. While I'm presenting, I can't monitor the chat anymore. But welcome to those that I saw. I'm going to do my own sort of more personal introduction. The professional one was great, but I want you to get to know a little bit about me and how I'm coming to this space.

I grew up in Rhode Island, just outside of Providence. And my father is from Peru. So I identify as a Latinx person coming to this space. I have been publicly educated through my life, and that has taken me as far north as Maine and as far south as Tennessee for education.

I really got interested in questions on how to save the world from an environmental sustainability perspective and was really enraptured with the idea of networks and building resilient networks. And I think that has been a theme that's sort of come up over and over again in my lives.

And that might be because I'm trying to connect with people with other shared identities. Queer, Latinx, women, mothers. I think some of the pictures that you see of me here are with some of those networks that have been so important, whether they be in biology, education, and math education, or working back in my hometown in New Providence or with my family.

And some of those have been more professional. Like QUBES as a platform came together because of a desire to network, build folks who were teaching quantitative and computational subjects in biology classrooms or trying to bring biology examples into quantitative and computational classrooms. And adding that peer support to professional development to findability of resources. It's just about bringing people together around common interests and using each other's expertise.

So you might see a little bit of that flavor as you go through some of the things that I'm going to talk about today, some of this idea of co-evolution, of peer support, and collaboration and interdisciplinarity that I hope you appreciate.

I'm going to start with sort of a big question first. Why do we invest in education? Why are we doing all of this? What do we really want for us? What do we really want for our students? What kind of world are we preparing them for? And what kind of world are they going to create?

And I feel like I'm just asking questions. I don't necessarily expect answers. But I would love you to reflect and take a pause. Why? For what? For whom? As we go through this.

I'm going to throw out some of the grand challenges of the decade. These are not the only challenges, but I think these are ones that I've heard, talked about over and over again. Social justice, democracy, public trust of science. And then everybody just can't stop talking about artificial intelligence. And I know there have been other talks in this series that have spoken specifically to advances in computing technology.

I want to take a step back and think about how some of these challenges might be related. So we might think about society and science and individuals as actually all the time interacting with each other. So this comes a little bit from my stance as an evolutionary ecologist.

But I really feel like we are in this relationship, and we are shaping each other as each other is moving forward together. So for me, it's very hard to bucket any one of these ideas. That said, I'm going to try anyway. I'm going to try to bucket some ideas into some of these categories of individuals, of science, of society.

So some of those big challenges. We might think about AI sitting in this bucket of, OK, that's a science challenge. How is it going to change our future or the dependence we have on big data in terms of driving decision making? Climate change as something to come together. And then in the past few years, COVID-19.

And so as we're talking, you'll see that I think, I hope that maybe there's some more intertangling between science and society. But maybe in the society bucket, I put social justice. Maybe I put public trust in science. Maybe I put democracy. And then as individuals, we're having experiences that are consistently informed by and informing these other areas.

And when you look around at the times we are living in, I'm going to take a page from a colleague of mine, Carl Bergstrom, and he'd be like this. These are the times we're living in. These are the kinds of challenges we're facing. They live in between these buckets, and here's an example. Very recently, last week, news article about deepfakes, deepfake robocalls imitating the President, saying, oh, maybe you shouldn't show up to vote. Now, OK, AI is directly meeting democracy. And you as an individual, picking up that phone and deciding, is this something that's legit or not, maybe had never occurred to you exactly before.

And so these things are getting messy. They're getting more intertwined. And I think my goal as an educator is to really think about why are we doing what we're doing for our students? How are we giving them the skills to navigate this new 21st century?

How are we giving them the self-efficacy and agency to take charge of the information that's around them? How do we not feel so disempowered by, oh, well, AI is going to take over our life. What are we going to do about it? How do we get some of that power back? What are our tools? Who are we as individuals, and how are we going to make decisions that are aligned with our values?

And so what is an educator to do to try to do all of these things? I don't think there's one right recipe, but I think, I hope to entertain you with some suggestions about what could be at the intersection of some of these spaces.

So for example, many colleges. And so I'm going to talk primarily about the post-secondary setting. Many colleges have some kind of general education outcome. Many, many colleges have as part of this some kind of every student needs to take some kind of science literacy course. Every student needs to take some kind of quantitative literacy course, et cetera.

And sometimes, those are designed for, quote unquote, non-majors for students that are interested. Even though I have a very interdisciplinary background, my degrees are in mathematics. And historically, it's been sort of an algebra course or precalculus or maybe even a calculus course that counts for this quantitative literacy requirement.

And then of course, statistics is becoming much more popular. So when we look at these general education courses, how are they meeting the challenges that I just described? How are they getting us closer to that? Are they asking questions like-- are they helping students read and understand graphs and tell stories with data? Are they helping students understand and ethically leverage computing? Are they empowering students to critique things that seem beyond their expertise, like big data models, and machine learning, and poor and manipulative representations of data, and robocalls. I don't know.

Are they encouraging students to think really deeply about science and science communication, especially when they invoke mathematical concepts like p values, and probability, and other statistics? Are they encouraging students to explore and critique bias in science? Are they encouraging students to develop some kind of framing for themselves in terms of ethics in scientific practice?

Are they challenging students to analyze structures of power and grapple with those structures and those decisions in their discipline and in their life? Maybe your courses are, and that is awesome, and you are doing a great job. But if you're interested in a source of, well, maybe not. What else is out there? I'd like to offer a little bit of what I'm doing here at Bates, which is a course called Calling Bull. And this is a picture from me teaching the course.

So the idea is that this exploration of what is bullshit, actually, I think is a great topic that's right at the intersection of that Venn diagram that I showed earlier. And so why? Well, a couple of principles. Bullshit itself is not new. I mean, technology is a strong part of the thing that is driving us right now, but bullshit itself is not new. It's something we've always lived with in one form or another.

But it has real impact. It can harm in real ways. And one of the issues is that with technology, we've amped up the reach and the impact of the bull that we see today. I forgot to put a bleep warning at the front of my talk. Hopefully it's OK if I just use these words.

So our ecosystem has gotten a lot more complicated by technology and the possibility of doing damage. There's 10 times much more information, 10 times much more possibility of doing damage. 100 times more people going to see it, 1,000 million. And we're just on this overload. And each piece of this information we have to stop and

figure out, is this BS? Is it not? Are we just going to filter it and pretend it doesn't exist because I'm just overloaded?

So we're not always using our critical frame when we see information thrown in front of us, especially quantitative information. And to add more to all of this, it's not just about technology and what we as individuals are experiencing. But then we also make choices in our interaction with technology. We share certain news articles with other people because the headline is great. Because we have a bias to believe the headline. We might discredit some individuals because of their positionality.

And all of those decisions that we're making as a group then get built into the algorithms that our technology has. So I think this is a really interesting case that really is at the intersection of individual society and science.

So a little bit about the context of Bates. Bates College is a small liberal arts college in Maine. I am in an interdisciplinary department called digital and computational Studies. What that means is that-- this is not computer science. We actually do not have a computer science department. This is, in part, the computer science department. But it's more than that. It's also the study of digital forms. It has been designed to be explicitly interdisciplinary and explicitly with attention to who's included or historically and contemporaneously excluded from technology and make sure that this is a space that's built for everyone, and particularly for those that are marginalized.

We have appointed faculty, three appointed faculty full time. One is a historian by degree. One is a computer scientist by degree. And myself, a mathematician by degree. So very interdisciplinary. But we all work in this digital and computational space.

As a department, we're committed to open education practices, meaning that we really make an effort to have all of our resources free for students, textbooks, reading materials, other things. Our software choices are informed by, OK, well, what is open source software? In other words, free and accessible to students, both while they're at college and once they graduate?

Open science practices, which informs our approach to teaching data oriented courses especially, and other kinds of pedagogical practices around opening student inquiry, making a difference, not just in the classroom and practicing concepts in the classroom, but showcasing work that matters outside of the classroom.

When I started at Bates, this was about six years ago, part of a cohort hired to help build this program, I wanted to develop an introductory course that was going to be designed

for social science students in particular. So I was talking with some individuals in economics, in politics. And in their disciplines, they have to take this upper level statistics course in their discipline.

And the students, once they're in that course, tend to struggle. There are some students that will struggle because they're learning everything about statistics. They're learning everything about programming with a language called R. And they're learning everything about how that particular discipline has conventions around their research and from a statistical perspective. And so that can be like quite the entry point.

But actually, that's not a problem that was unique to some of the social sciences departments. Biology was actually very similar in its needs. So I was like, OK, so what 100 level intro programming course-- Can I give them this introduction to programming confidence and familiarity before they do something that's more oriented in their major? What can I do that really falls the philosophies of our department, gives them sort of an introduction to critical digital practice, as well as computational thinking and sort of balance these other needs that the other departments thought were really important, like data visualization skills, for example. And then hopefully world skills like the ones we just talked about before.

So fortunately, while I was having all these conversations, I had recently just had the most awesome opportunity to see a colleague of mine, Carl Bergstrom, give a talk about a course, he had just developed at the University of Washington. And that course was called Calling Bullshit.

So Carl and his colleague, Jevin West, this was just after the 2016 election, were really concerned that about this sort of narrative or the new dependence on getting information for elections that was based primarily on social media. It was a real shift in how folks were gathering information and doing decision making, and that shift in our information economy was really just encapsulated by the 2016 election.

And Carl comes at this from a very similar background to my own sort of thinking about ecosystems, thinking about information. And Jevin West comes to this as an information theorist. So they did this wonderful thing and made this one credit course, large lecture course called Calling Bull. And then they made all of their course materials free and open for everyone. So you can get access to it, callingbullshit.org.

And so it's a series of a syllabus, a series of suggested readings, case studies, et cetera. And in addition, they have videotaped all of their classes as well, and all of those videos

are edited and put onto YouTube. So it's just a wonderful resource if you're wanting to think about teaching a class like this.

Now that particular class again was a one credit in the sense that it met once a week. It was a large lecture, primarily lecture-based class. They do have some really nice case studies, and they take the students through that in the context of the lecture class itself, and they have some really nice assignments.

But when I was thinking about, OK, well this is really interesting content. How do I mesh that with the overall other goals that I have? I added additional content to it. So what I did was I incorporated introduction to data visualization materials. Not in this like formal data science kind of heavy way but in a light lift way.

Thinking about students that might be taking this as a general education requirement, I reached out and used materials called Figure of the Day from a wonderful NSF project called BIOMAAP, that was focused on tools for biology instructors to use in the classroom for students that had math anxiety. And it's just a nice, what do you notice/ What do you wonder about this figure?

And observe collect, draw, which is about starting first with pencil and paper, kind of drawing different ways that things can be visualized and thinking about it as storytelling before you jump into any kind of computer-aided graph making. And then some of those actually were introduced at some of the same bioquest run conferences with QUBES. So again, another great resource.

And I mentioned Carl and Jevin had done these really nice case studies. But the students, they were presenting the case studies to the students. The students were not involved in digging through the data themselves. So I really wanted to do something that was really going to build student skills and agency to get students to that point where they could really dig through it themselves.

So I took their case studies and made projects around them that were all in the R programming language for data exploration. And in order to introduce some of the R skills, I had students working through some tutorials in DataCamp, which provides a free classroom for all students. So you can import their courses, and it's completely free for students to access the ones you assign them. And also, they have access to the entire library if they're curious to learn more for the duration of the course.

And I introduced tools like for programming in R, like RStudio and Colab. And we had these little exercises in class to reinforce all of these things. And my goal was to bring

together in this really like, let's not scare you with all of the programming right away, but let's think about some really interesting content.
How might you think about leveraging programming here? What kind of information are you looking at? Let's get you to look at it a little more deeply, a little more interestingly.
And this is the composition that I've created through all of those lenses.
As far as the content, let me just give you a quick walk through idea of what's included in this class. Because I'm teaching Calling Bullshit, and you're like, yeah, but what are you actually teaching in that class? I'm going to start with just the overall philosophy. I think community building is really important in this course because we're really critiquing ideas, and we got to be comfortable with that. So critical practice, absolutely important.
I want to leverage cultural wealth. This is an idea that says students are coming into the classroom with a lot of wealth already. You're not pouring the knowledge into their heads because they're empty. Students are out there. They're interacting with information, even if they don't think they are, because some of them have sworn off social media. But they are interacting with all sorts of information from all sorts of directions.
And they have all sorts of knowledge and interests. How do we bring those insights and those multiple pieces of view into the classroom/ How do we leverage that for student engagement? So that's a really important part that I'm always thinking about.
And then like I said before, I'm really focused on getting them to build their skill set, not just because it's skills but because it gives them the feeling like I can do this. And the next time I have information come across my plate that's high stakes or suspicious in some way, I have the agency to ask questions and do something about it.
We go into intro with all of these ideas. We get them to really think about critical data practice. So introducing or reintroducing some common tricky spots and statistics, but also getting really into what is AI? What is machine learning? How does it work? Let's just open up the black box a little bit.
And we start talking about racism in science, sexism in science. Other kinds of ways that people are marginalized in science, at least through some of the data that we're looking at. And then we zoom out even more to the whole ecosystem. Why does fake information propagate? Why do we have a public mistrust of science? How does science work? And what are the economies that drive science that can result in practice

that's not ethical? And what, as professional societies, are we doing about this? What as individuals do we do about this?

And at this point, my goal is to get them to, after being able to do these projects and think about the ecosystem and big ideas, I'm gearing them up to start choosing an investigation all of their own in the final part of the course. And saying, OK, here is here's some information that I had thrown at me. And I'm going to investigate it. And then I'm going to communicate what I found. I'm going to reflect on my learning.

And it's part of this overall philosophy of open as resistance. Like let's dig in there. Let's open up the conversation. Let's not be a passive actor in this information ecosystem. Let's take charge of our own learning, of our knowledge of our information.

This can be difficult to do because when I first adopted this course, I was very much thinking about the side of it that was worldly society, economics. I was thinking, OK, like I'm going to have to teach R for the first time. I've used it in research, but it was the first time I had taught it explicitly in the classroom.

And so, oh, man, that's going to be a heavy lift. I was nervous about that. And DataCamp was actually quite helpful. I was keeping up with all their boot camp exercises a little bit more faster than they were. But that actually, that was doable. That was doable. Then I thought, OK, well, I'm going to have to start teaching about AI. It's going to be like hard. OK. No, that was OK. That was doable. I had to read a lot of papers for this class that the Calling Bull syllabus suggested in philosophy, in economics. That was a stretch. I learned a lot about economics that I didn't set out necessarily or think I was going to do, but I did it.

I think the hardest part though has been to really think about putting the information about justice into this curriculum. Not because it doesn't fit but because it can be kind of scary. Am I going to screw up in the classroom? Is somebody going to say something? Am I going to handle this situation right? But I think we absolutely need to have these conversations.

And here's an example. And sometimes, bullshit finds me. I didn't go out looking for for a lot of this. But here's an example of one that I brought to class I day because I saw it in the news. And so I'm just going to leave this up for a second, and you feel free to drop observations in the chat if you'd like to.

What are some of the initial take home messages you get when you see this graph? This is a graph that's talking about pre-pandemic employment levels compared to one year later.

I think there are some brave folks that have spoken up. I mean, you might reflect on what is the take home message of this? You might also think, well, what questions does it get you asking? It's kind of interesting.

Yeah. The Hispanic workers, it says it may be of any race. So we don't really exactly know how the data is compared. Hispanic and White. Hispanic and Black, for example, could be a thing. We're kind of looking at some of the other chat observations. What does it mean back at work? Which I think this is employment levels.

You might say like, oh, I really thought that, and you could be, oh, gee, I'm really surprised that the line of White workers are just not back to work as fast. And that's a very honest reaction. I think that's what you get out of this graph. Let me dig a little deeper into that.

Here is a completely different graph in the exact same article. In this figure, now we see something slightly different. We see that we're talking about percent increase and percent decrease. Well, in this case, they're all decreasing overall after one year. But instead of it being an absolute number of comparison, now you're looking at percentages within each category.

Why does that matter? The reason why it looks the folks who are White are not getting their jobs back as much as others is because there are just more white people in this data set. And so even if, magnitude-wise, there are still quite a few folks out of work, that is actually a smaller percentage wise than some of the other racial and ethnic categories.

And we don't really see this until we actually see the data in a percentage format. And then this also includes information about how gender interacts with that. So now, we're starting to get at questions just from looking at a figure, just from asking questions. We're already starting to dig deeper into complex theory that's about intersectionality and data and how that is or isn't reflected in a data analysis.

Here, this story tells us something different. It tells us that on average, folks who in the census data set who were identified as White or Asian, lost similar employment amounts than those overall who identified as Black or Hispanic. But within Black and Hispanic categories, as well as Asian, there are particularly marked differences in the

return back to work of women versus men. And we can almost see that the levels of return to work among men are actually quite similar but much, much lower for Hispanic and Black men.

That might be enough, but we can also say we can also maybe wonder and notice who is excluded from this data altogether. For example, where do non-binary people fit into this data set or those that classify other than men and women? Where do Indigenous people, Native Americans, fit into this data set? So it's not just about what is there and what is presented, but what is not there?

Here's another case study that's presented by Carl and Jevin on their website. They go through two just case studies of very, very egregious scientific studies that use machine learning to classify individuals. So in the first article, there's a study that looks at a data set of faces and individuals and tries to build a machine learning algorithm around that data set that can then be used to look at and identify who might be a criminal and who is not a criminal.

All sorts of problematic things. You might just ask, why would somebody build that kind of technology or be interested in that algorithm? But Carl and Jevin say, you don't need to be a computer science expert if you just know generally that machine learning algorithms are, if you put junk to train a machine learning algorithm, if you put junk in your picture data set, you're going to get junk out.

This is garbage in, garbage out. Trash in, trash out. There's variations on this. So he just takes folks through, and he says, well, let's look at what kind of data they trained this on. And where did they get their IDs? Well, they got their IDs of the non-criminals from basically the equivalent of LinkedIn, and they got their training set for the criminals basically from their mug shots.

And so if you look at the picture here from that, Carl kind of says, well, they might as well just be looking to see if you're smiling or not. What is this really testing? And then also, we can ask why would anybody ever do this study. There's a similar study in terms of some egregious, ethically questionable study, trying to identify folks who are gay from photos. So trying to identify sexual orientation from a picture.

And again, you might say, well, why would somebody do that? What are the consequences for that? And that should be enough. But they also take this dive into, OK, what data are they using? What are the assumptions they're making? And if you look at the assumptions, their assumptions are fundamentally, that you can say some kind of

difference about somebody in terms of their identity, in terms of their character, et cetera because of the structure of their face. And this is not new age bullshit. This is actually old school bullshit. This has been bullshit that's been around for a while.

As part of a humanizing perspective that I was taking in this class, every year, I go back, and I say, OK, what could I do better? And one particular year, I said, OK, the thing I would really like to do more of is every time we have someone named, like something's named after them, some statistical tests, something we're doing. If there is a name, I want to talk about that person.

And I was like, I want to humanize what's going on here. So one of the very first, and maybe it's the second name that we really come across in terms of techniques, is something called Pearson. So Pearson comes up because we start talking about correlation, correlation analysis. Because we have this module on. Is it correlation or causation, and what's the difference?

And if you dive a little bit into who Pearson is, you find some really, really disturbing things. So here is a quote from a really nice article in a historical journal by Quick in 2020 called The Making of a New Race. And this is a quote from that article.

During his lecture, Pearson claimed that Ling-- Ling was a dog. When considered alongside her relatives, many of whom were on display outside the lecture hall that evening in UCL's main quad. It's a university. Could be understood as having unparalleled significance for understandings of human nature, racial difference, and the future of the British Empire.

The dogs, he explained, represented the possibility of turning the entirety of the empire's peoples into civilized citizens. In other words, the kinds of statistics that were being developed for, quote unquote, dog breeding programs, had a more sinister side. The more sinister side was to justify imperialism and slavery in the 1800s and 1900s.

So we sometimes think, oh, well, but that's old. That's old, right? Those techniques were developed because as part of this justification process in order to justify British imperialist imperialism and the way that they treated their colonized people, the way of doing this, they said, well, we just have to get science to say it's OK.

And if science says it's OK, it must be OK. And so then you go into, well, how do we get science to be OK? Well, we just have to measure these differences. We just have to

show that these differences exist between dogs, and we'll camouflage it as dogs. But it's really about differences between people.

And this started a pseudoscience field called phrenology. So the underlying mathematics of regression of the normal distribution, all of these statistical concepts that are important in today's big data world and that machine learning is fundamentally based on has this dark history of being used specifically for these reasons, which we call, oh, those are egregious machine learning models.

But that's because-- that's actually something that should be expected given the roots, the toxic roots that this has come from. And we don't talk much in statistics class. Maybe some do, I hope. But a lot of times we say, well, that's eugenics. Oh, well, that's phrenology. That's pseudoscience. We don't talk about it in science class. That's the social studies.

Is it? I don't know where is it getting talked about. I think we all have a responsibility for talking about these things that are at the intersection of our fields. I think it's important for me to know that this field was developed for those particular purposes, and I need to make sure that when I'm interpreting and using my statistics or machine learning models, that I am not just replicating what's been done in the past.

So that can be really scary. OK, like come back to it. Like what if we don't talk about it/ What are we saying? And I think this is like the great counterargument for giving ourselves the courage to start thinking about whether these topics can belong in our classrooms.

This is a study by Haynes and Patton, who are educational researchers, and they did a sort of a qualitative case study analysis on a couple of different instructors who were teaching courses and how they handled situations that might be related to race in their classroom.

And here's a quote from their paper. Faculty, like Arnie, who exhibit lower racial consciousness, often exempt themselves from the learning processes and make pedagogical decisions that recenter Whiteness. When that happens, white faculty maintain their position as expert. If Arnie, as expert, fails to confront race and racism, his silence communicates the minimization of race and racism. In other words, by not talking up, you're already making a political statement.

I'm going to close my pitch for teaching this class or class like it. It's not just about student skills development, about this critical frame. I think it's also about lifelong

learning. I think it's about civic engagement, digital citizenship, having a healthy relationship with science. I think it's about our own learning as instructors. How we can build the kind of classroom community we need to build to have critical conversations, learning new content, and being less afraid to stand up here and talk about it.

So if you're interested in specifically teaching this, or maybe you want to show this video when it comes out to somebody, a friend, and say, hey, you should really consider teaching this, RIOS Institute is actually going to host a question and answer driven workshop about what kinds of considerations might you want to think about if you want to adopt a course like this at your institution. So if you're interested, we would love to have you join us there.

Just a big thanks to ELE for the invitation again. And thanks for all of the folks who have been important to this work. A special shout-out to the student instructional support team, my attached tutors and research assistants, Sadie Kriegler and Joaquin Torres. Thanks, everyone.

NORMA HOLLEBECK: Thank you so much for such a wonderful experience. This has been a great opportunity for us to learn a lot about BS and that integration with the machine learning and those concepts. That's wonderful. So we really do appreciate it. We do have a couple of questions. We don't have a whole lot of time left for the questions. So we're going to run through the top two. One of them has to do with the computational science topic that you had brought up earlier in your discussion.

When we're looking at the lack of that ability for students to really understand those quantitative pieces of data, we also see that math scores for like 13-year-olds in the US are at a historical low. And for Black and Native American students, the scores have dropped even more significantly, something like 13% and 20% respectively.

We clearly have a math problem in the US that is disproportionately harming minoritized students. Is there a math education need for an overhaul?

CARRIE DIAZ EATON: Yes. I think that there are reforms ongoing that are really fantastic and amazing. I think here, it's been getting people on board and believing it. And unfortunately, I think there's been some trust ruined by how professional development, so that our teachers can appropriately reach those and feel supported in reaching the new curriculum demands. That part has not gone so well. So I think that's been really rough.

I think there are a couple of things. One thing I worry about in the post-secondary context when this question comes up is that we push the burden of responsibility on to K-12 and say, oh, well, we're not responsible for low numeracy. We don't have to take care of that. They should have come to us prepared.

And I think there are two problems with that. One is that they can have fine numeracy and then just not know how to apply it really well to the new context that we're talking about. And then I think secondly, I mean, everybody keeps pushing it to the person that was before them. I think that anybody can make that argument.

And so I think both are a way of saying, well, we're not responsible. We're not here to solve it. And I think something like Calling Bull, it does start right at numeracy. It starts at-- I give them this question, like if Bill Gates had all of his money in pennies, could you pave a road to the moon and back and just use back of the envelope calculations estimation? Is that bullshit? That I think he has enough money to pay his way all the way to the moon and back. Not to pick on Gates. I know there's some Gates funding.

And I don't know if I want to do a spoilers, but yes, he has more than enough money. Like you could do it in dimes, I think, and he would have enough money. And that's kind of shocking. But let's start with numeracy. Let's start there. I don't see why we can't anywhere.

NORMA HOLLEBECK: OK. So making that connection between, like you said, we pass it off and say, well, they didn't come to us prepared. What can we do in higher ed, so that even if the students are coming to us and they're not at what we are expecting as higher ed faculty and staff. How can we bring that in and really help them to integrate those computational pieces into their learnings, even if they're not going to go into the sciences?

Let's say, like you said, if they're going into the social sciences or humanities, how can we really help them fill that gap, if that's what we want to call it, from K-12 to higher ed? What can we do to really make sure that we're turning out well-educated students that have that ability?

CARRIE DIAZ EATON: Yeah. I think a lot of it is about relevant pathways. That is one answer for that. I don't think we offer enough relevant pathways. I don't think we're often great at saying, this is why this information you're learning right now is so compelling, and you really need it like for your life.

We're expecting students of all walks to come and just automatically we're going to just support them to be successful in a particular kind of environment with a particular definition of science and mathematics that they've never been successful in, probably have been told they're not successful in. And then we're just going to get them up to speed in our system.

And I think that framing itself is really part of the problem I think we need to say. What strengths and skills and interests are our students coming with? What do they need to be to move forward in their careers/ And how can we give them a pathway that allows them to do that? I think that's maybe some work in changing our reframing of the issue, then reframes our possible solutions.

NORMA HOLLEBECK: OK. To build on that, do you think that faculty are afraid of doing what would be perceived as being political when teaching math or anything?

CARRIE DIAZ EATON: I do think that for both math and science, there has been a culture of science is separate from society, and math is separate, and somehow pure, and absolute, and apolitical or something. To me, education is political. Political is not the same as partisan. But all of these choices we're making, every choice we make as an instructor is already political.

And the choice not to speak in class is also political. So you are already, in my view, you are already being political with your choices. The question is what do you want that to say about you as a person? I do understand that the climate is getting more and more hostile as a reaction to the progress we've made, recognizing these connections and recognizing some of the toxicity.

Now, it really is swinging back to the witch hunt side of things and trying to really stop the progress we've made. And some of us have the agency to do things more outwardly than others, shall we say. I always hope that the core, one of the things I really appreciate about RIOS Institute is that we provide a place where people can talk together about these issues and sort through them.

I don't think I'm going to answer for you, what is the right decision for your classroom, but I hope we can create communities together, that we can support each other through what are really important times for our country.

NORMA HOLLEBECK: So we are out of time, but I really do want to thank Dr. Diaz Eaton for her time today and such an insightful discussion on the BS that's out there and how

we can start working through that. I would like to, for our audience, thank you to our audience for being here. Thank you for being here, Dr. Diaz Eaton. Audience members, I would like you, if you can, take a few minutes out to complete our survey for today's presentation using the link that we're going to be posting in the chat for you. If you've got something else going on immediately after, don't worry. We'll send you the link to the survey in a follow through email that you'll be receiving tomorrow, as well as a link to this recording.

I would like to give you a brief look at our strategies for success schedule for the series. We do encourage you to register for the remaining two sessions if you have not already done so. I'd also like to encourage you to submit a proposal for our upcoming project, The Impact of Digital Learning on Minoritized Students. You can get more information on our website about that. But the bitly link is there on the slide if you are interested in submitting your proposal.

Finally, we welcome you to visit the Every Learner Everywhere website and the resources page. All of our resources are free to read online or to download. So with that said, I would like to thank our guest speaker today, Dr. Diaz Eaton. I would like to thank our audience for taking time out to learn a little bit more today. And we look forward to seeing you next week for our fourth webinar in this series, in which Mark Watkins will be discussing building AI literacy with students. Have a wonderful day, and we thank you very much.