

The SRI Homeroom – Episode 14

Kori Hamilton Biagas:

Welcome to The SRI Homeroom. Today, a more inclusive approach to digital learning.

Shari Gardner:

We see the need and we see how technology has been impacting all of our lives, and there's so many advancements. And so how do we apply those advancements to this gap and this need?

Kori Hamilton Biagas:

Improving access and engagement for all students, today on The SRI Homeroom. Welcome in. Hello and welcome to The SRI Homeroom. My name is Kori Hamilton Biagas. I'm your host. I am here today with two incredible researchers, Shari Gardner and Jenn Nakamura, who are both experts in inclusive digital learning. Welcome to the podcast.

Shari Gardner:

Thanks, Kori.

Jennifer Nakamura:

Thank you for having us.

Kori Hamilton Biagas:

It's such a pleasure. So in this space, you kind of entered it from different points of expertise in different areas, but you have this shared desire and passion around inclusivity in digital learning. So with this shared expertise and interest, what are you trying to solve in education by addressing inclusive digital learning? Shari?

Shari Gardner:

Yeah, that's a great question. So ensuring that all individuals, regardless of ability, have equal and meaningful access to content that they experience in their everyday lives. And that could be what they experience in school and the classroom, or even just scrolling their phones. Just having that equal and meaningful access is what I think we're really trying to achieve together.

Kori Hamilton Biagas:

That's really important. And so how are your projects more specifically and intentionally addressing this challenge and working to find solutions for individuals who have varied abilities?

Jennifer Nakamura:

So I'll dive in a little to the Alchemie project that we currently work on. So Alchemie Solutions is a small business who focuses on making accessible digital platforms specifically to support students who are blind and low vision. And so we have been partnering with them for almost two years now, and they're developing a program called Kasi. And so Kasi combines digital interactives, physical manipulatives, and then also computer vision technology to create a multisensory platform for students to engage with

chemistry content. And so we have been... Yeah, it's super exciting. It's a great product and it's been so much fun.

So the first phase of the project is engaging in formative research, so initial research to kind of help refine the Kasi program. So we've been partnering with students who are blind and low vision studying chemistry and also their instructors to sort of learn about their experiences using the program. And we're sharing that information back to Alchemie so that they can make adjustments to the program. And then this spring we're going to actually be doing an evaluation of the Kasi program to see how it supports students in learning chemistry content knowledge and also their self-efficacy in chemistry. And we are specifically for that evaluation focusing on students who are blind and low vision.

Kori Hamilton Biagas:

Yeah, I love that you have that engagement with students more directly. When you get to really speak with those who are most impacted by the use of the tool or the resource, it's so much more rich in the dataset that you have to give back to the client and say, "Hey, this is what the people think. Make some adjustments." That's so cool. And so what are the other ways? So Alchemie is a single project and it's focused on chemistry. It's focused on people experiencing blindness and low vision, but we know that there's such a wide spectrum of disabilities that people in school settings and in home settings need support around. So what are some of the other ways and other solutions that you have been working on to advance this inclusive digital learning space?

Shari Gardner:

Very good question, and I think both Jenn and myself have done other projects over the course of our time at SRI that focus on different aspects of learning for different student populations. Previously, for example, with the [OSEP-funded] CISL Project, which was the Center on Inclusive Software for Learning, so that was a very fun acronym, [SRI worked in partnership with CAST and other partners to develop] a tool called Clusive, which was really focused on learners with learning disabilities, things like dyslexia for example, and creating a program where it allowed them to have reading made more accessible to them. They could change the text size, the background color, even the font style. And so really making this personalized space.

Jennifer Nakamura:

And so I think given some of the other experiences that Shari and I have had on our various projects, it really got us thinking about accessibility in different areas. And one area that we've become increasingly interested in, and it's going to sound very broad, but this idea of data accessibility. So data we encounter in every aspect of our lives, whether it's at home, at school, at work.

Kori Hamilton Biagas:

How do we encounter data in every aspect of our lives?

Shari Gardner:

So social media, for example, thinking about when you go to read a New York Times article, there's often a visualization that could be a scatter plot, it could be a heat map, it could be any of those things.

Jennifer Nakamura:

Financial data.

Shari Gardner:

The stock market. It's everywhere. When it comes to kids, I mean, we can't help but think about STEM a lot, so science, technology, engineering and math. It's such a huge focus these days in the classroom. And so data is a critical component of every single one of those disciplines. And math, it's more obvious when you think about statistics and things like that. In science, you have a ton of data you're collecting in physics and chem, we talked about that obviously with Alchemie, engineering, it's all about data. Does this work? How am I constructing this thing? And then obviously technology, we have tons of big data, so you're just encountering it 24/7 essentially. And I think also through this project, just like Jenn was talking about and that you commented on Kori, we got to really work with this community together, start to hear their perspective, start to understand the barriers and challenges, especially when it comes to data and data visualizations, which is how we then got onto this very, as Jenn mentioned, like broad idea of accessible data.

Kori Hamilton Biagas:

Thank you for that context. Thank you. Because we are in a research setting where we are really not only encountering but working with and around data on a regular basis, but so many people in their everyday lives don't necessarily think about what you were just describing as data that we're encountering in all of our everyday lives. So I just wanted to make sure that we elevated clearly what we meant by that. Yeah. Okay. So keep telling me, so you have this broad vision. Go on.

Shari Gardner:

Yeah, so we're really fortunate that SRI has the opportunity for researchers to get internal funding through the institute to work on projects that are really meaningful to them. It can kind of serve as a stepping stone, leading ultimately to more external funding from organizations like we've talked about already, National Science Foundation, Department of Education. And so specifically there's a program that is through the education division where we are housed, where you can apply for internal funding. You talk about your idea, what you hope to accomplish, why you think this is so important. Now, we've been really lucky to get this internal funding to do some really initial groundwork towards an accessible data system. And so our internal funding specifically was to lay this groundwork now that we understand some of the barriers. We needed to learn more and understand what are the gaps and how can we fill them, and how could we potentially develop something that would really address all of these challenges and barriers that we're seeing for the blind and low vision community around data and data visualization.

And so for us, Jenn and I thought through this, especially when applying for our internal funded project and realized that first step was really doing a full thorough in-depth landscape analysis. I know that can mean many different things. And so what that means for us is one was a literature scan, so identifying key terms around AI and data and accessibility and doing a full literature scan that also included a market scan to understand what's on the market to serve this population and to meet this need. Are there technologies out there that are trying to make data and data visualizations accessible?

Kori Hamilton Biagas:

And so we're still focusing on the blind and low vision population and how they are able to engage or not engage with data. And so creating a solution around that component, that element.

Shari Gardner:

Exactly. And I'm glad you actually brought me back to that because something that I think is really important is we are focused on this population and it's a low incidence population, so it doesn't actually normally get a lot of attention. And so it's one reason we're so passionate about it is we want to give voice to this community. But the other thing I think people often forget is that when you're designing something for a community that experiences a lot of barriers and challenges and you're designing something to meet and address those barriers and challenges, you're going to meet the needs of a wide range of the population. It's not only going to be for the blind and low vision population, it's going to meet the needs of so many.

Kori Hamilton Biagas:

Inclusivity helps everyone.

Shari Gardner:

Exactly.

Kori Hamilton Biagas:

Yeah. It's like the cutouts in the sidewalk don't just help people who are in wheelchairs or physically impaired. They help mamas with strollers as well. There's so many people that ramps and things give access to that improved data systems will give access to, it extends beyond this. But when you focus on those really narrow groups you can create solutions that have wide-reaching impact. Yeah.

Shari Gardner:

And the last thing I'll say, and I'm turning it over to Jenn, is that co-design was a huge part of this internally funded project for the very reasons we're talking about. We didn't want to do anything... "nothing for me without me" is very common in the disability research and field.

Kori Hamilton Biagas:

With and not for.

Shari Gardner:

Exactly. And so we wanted to make sure we uncovered the perspectives and experiences of this community through co-designing with them versus coming up with something on our own and then retroactively going to this community. So that's a big part of the internal funding.

Kori Hamilton Biagas:

I love that.

Jennifer Nakamura:

And another thing I'll mention is that we, in our landscape analysis that Shari described, talking with experts in the field, talking with individuals, data users with lived experiences doing a literature review, we have compiled a ton of best practices around presenting data, both raw data that's, for example, in an Excel spreadsheet all the way to different types of data visualizations. So right now we're working on organizing all of those guidelines and strategies into a cohesive framework that's going to help all individuals be able to adhere to those best practices for data accessibility. And I'll note that in

developing our framework, we're drawing from a great resource called Chartability. It was developed by Frank Elavsky at Carnegie Mellon, and it includes a set of testable questions for ensuring that data visualization systems and interfaces are accessible. And so we're really excited about that. And another thing that we're really excited about is, so Shari mentioned we're both in the education division at SRI, but SRI has a lot of different divisions.

So one of those has a lot of expertise and capabilities in artificial intelligence, our Information and Computing Sciences division. So we have been engaging in some discussions and collaborations with folks in that division as well. And we've been really learning more about the different capabilities that we have here at SRI around technology and artificial intelligence. And we're really excited in thinking through ways that we can leverage those to help mitigate some of the challenges that individuals, particularly those who are blind or low vision, encounter when engaging with data and making it more accessible to them.

Kori Hamilton Biagas:

That's another example of the, "We have this expertise within our organization. We don't have to recreate the wheel. We don't have to read every single journal article ever written. We can put a chat in the Zoom channel or send an email or make a phone call, and we can have that access right at our fingertips." And being able then to integrate the voices of those who are most impacted with some of the most cutting edge thinking and research around AI. That sounds like an extremely exciting opportunity for the two of you to be able to collaborate with the clients, to be able to collaborate with those who will be impacted by your solution, and to be able to collaborate with those who are really far along in AI technology and understanding its uses and impacts.

Jennifer Nakamura:

Yeah, we've been able to move it along and really dive into this topic. And the folks that we partnered with there are really excited about the opportunities as well. And we've been really fortunate to find individuals who, for example, are really passionate about the co-design process like we are and things like that. It's been great. And I'll also just give a shout out to one of the individuals that we met through the Alchemie project, Dr. Hoby Wedler, he's the blind chemist among other things. He does a million different things. But he's been really instrumental in thinking through our ideas and partnering with us every step of the way. And so we've been really fortunate to have him as a collaborator in this as well.

Kori Hamilton Biagas:

Oh, yeah. I mean, that sounds like a hugely impactful resource and a really great guide as you are developing and connecting with people and him being a member of the community that you're supporting and serving helps to kind of mitigate some of those connections, like that insider-outsider perspective because I get that sometimes, "I don't want to be studied or I don't know if I want you who doesn't have my experience to come and help me." And so the idea of connecting with people within the community and working directly with those who are using the tools makes such a huge difference in also, I feel like your legitimacy as researchers, because you're not like, "Hey, we're going to come in from over here with the answers." It's like, "No, we're going to show up with you and we're going to figure out the answers together." I love that mindset you have around co-design.

Jennifer Nakamura:

And another thing I'll add, I think Shari and I were talking about this earlier, it's just that it is such an amazing community and it feels really special for us to be able to kind of be a part of it. Everyone that

we've talked to throughout our internally funded work, whether it's experts in the field or data users with lived experiences, everyone's just been so generous and willing to share information and to collaborate. There's just this attitude of we're all really invested in this. Let's work together, share our resources, and really try to bring about positive change. So I've really... I think that also it's just a nice feeling. It's great to be a part of it.

Kori Hamilton Biagas:

And so one of the things I continue to wonder is if you could expand your work, what might that look like and what keeps you coming back to this space around inclusive digital learning? Because that's not where you all started, but that's now kind of a niche area of expertise that you're operating in. So what keeps you coming back to that particular space?

Shari Gardner:

That's a great question. I think we're passionate about that, which is just a high level vague answer... We see the need, I think is the real answer. We're in 2024, and I've been doing this work really focused on these populations since 2015, and I don't see much change. So that's one thing that keeps me coming back is I still see a huge need. And as we're moving towards more technology, more digital learning for people to understand and be aware of the challenges, the barriers, and to be able to actually know how to address some of these things, which is why, as Jenn mentioned before, we're really excited about our framework that we're trying to inform what are these best practices that a developer can apply that a teacher should be aware of that a manager at work should know about. So I think that's really one thing that keeps us coming back is the need and the fact that we see how technology has been impacting all of our lives, and there's so many advancements. And so how do we apply those advancements to this gap and this need?

Kori Hamilton Biagas:

Mm-hmm. And so if you were able to see the needle moving more Shari because you're like, "I've been doing this since 2015 and I haven't seen a significant change," so if you begin to see the needle moving more, what does that look like? What does that significant change that you want to see? What does that look like, Shari? And then Jenn, I want to know from you too.

Shari Gardner:

Yeah. I mean, for me, it looks like people not trying to retrofit new technologies that they're creating. Something will be developed and it's going to have all these bells and whistles and seem so innovative. And then when they're doing perhaps a feasibility or user study like we do with our work, they're going to realize that it's not going to meet the needs of these users that have a wide range of abilities. Not everyone's going to think about the blind user right off the bat, but think about the person who just generally isn't used to engaging with data. What about that person who maybe is colorblind and you're using every color in the rainbow?

So this retrofitting approach is a bummer and never usually really pans out. It's going to wind up only working for the most able groups, and then you're not getting that wide range of use. So I would see people not retrofitting. I would see them thinking about these populations, talking to them from the onset, perhaps having a division that prioritizes this and is focused on this within large companies. And when I think about the big tech companies out there, I know there are people with titles and divisions that sound like they're focused on this, but another big issue is that they're only designing for accessibility as far as it meets the law.

Kori Hamilton Biagas:

Compliance.

Shari Gardner:

Right. It's all about compliance, and those standards aren't very high. And compliance doesn't mean truly inclusive or accessible.

Kori Hamilton Biagas:

It means compliance. It doesn't mean inclusive. It doesn't mean inclusive. It means I'm not breaking the law.

Shari Gardner:

They're not breaking the law that a school can use their funds to buy this product that might not in fact be accessible, but they have the stamp of compliance and so moving-

Kori Hamilton Biagas:

Like the minimum.

Shari Gardner:

It's the bare minimum and it just doesn't really meet needs. So I think also getting people to want to move beyond compliance would also be that needle moving. We would see more of that.

Kori Hamilton Biagas:

Yeah. Jenn, what about you? And I'm thinking not only just in this inclusive digital learning space, but across all the areas of expertise that you hold right? As a literacy person, as an early learning person, as a person who cares broadly about children with disabilities and their families using inclusive digital learning as a tool, but thinking about all of what has brought you to this point, what would that future look like?

Jennifer Nakamura:

Yeah, I think that's a good question. I think I'll just add one thing to what Shari was mentioning that I think would be really something we're hoping to see in the future is... so we've talked about how we're compiling a framework of best practices and guidelines for data accessibility. And in the future, we are hoping that, I think it's not an easy lift. It would take a long time. We need a lot of input from a lot of different people, but we want to be a part of building a set of guidelines and standards that are widely recognized and are kind of the go-to and that people, like Shari said, proactively adhere to them. And so just really codifying those is something that we're hoping will become the standard in the future.

So we're really excited about that. And then I think what we're hoping to see in regards to the system that we are hoping to develop, I think what that would look like, would be so amazing to see if we are successful, is that it would be used in a range of different contexts. So all the way from high school STEM courses to the workforce, to even Shari mentioned, those data users who don't even really recognize how much they are data users just engaging with data in their everyday life. Just building something with, again, in collaboration with the community, that can be widely used is the end goal for us.

And then I think to answer your question about beyond that, I think maybe even we, in designing this accessible system, could lay the foundation or kind of serve as a model potentially for other digital platforms and other areas. Potentially they could incorporate some of the practices that we're identifying and some of the approach that we're using to designing this that I think it could be applied across different types of educational or even beyond education digital platforms. And so I think maybe that could even be another long-term goal.

Kori Hamilton Biagas:

Yeah, it's like usability in all the sectors. How can you change the face of how data is used and looked at and creating that framework in a way that one, I would hope it's like I could take it off the shelf. I don't have to be a PhD to understand the framework. I don't have to have years of research experience in order to utilize this. But then making it such a standard is just like a norm. This is just what we do. This is part of what we're all doing, because it makes the most sense.

Shari Gardner:

Yes, exactly. Makes sense to us.

Kori Hamilton Biagas:

Makes sense to me. So we're coming to the end of our time together, and I'm wondering if there are any things that you want to leave our listeners with, words of encouragement, takeaways, things they should be looking out for that are coming their way soon? Last words. Jenn, I'm going to start. I'm going to give you the first last word.

Jennifer Nakamura:

Okay. I guess just if anyone hears what we shared today and it resonates with them on whatever level, please feel free to reach out to us. I think community engagement and involvement is really what makes our work possible. And so anyone who's also interested and passionate about this area, we'd love to hear from you. So yeah, I would just say... and also stay tuned. We're hoping to really be able to do a lot more dissemination of what we're doing in the future and really dive in. And so yeah, stay tuned.

Kori Hamilton Biagas:

We'll put email contact information in the show notes. Shari?

Shari Gardner:

Yeah, I just want people to be aware of the challenges and barriers that people experience in all walks of life and try to think about people on both ends of the spectrum. If you're a developer, when you're designing, if you're a teacher when teaching, if you're a parent when parenting, whatever you might be, just remember that everyone kind of learns and thinks and perceives life differently. And so to keep some of these things in mind as you go on with life. And lastly, stay tuned like Jenn said for everything that's coming out, especially the framework. We're really excited about it. We hope that this is something that everyone can easily refer to, that it's digestible and usable and will facilitate what I'm saying right now in terms of thinking about the needs of all users.

Kori Hamilton Biagas:

Awesome. Well, that is our time today. It has been such a pleasure. Thank you Jenn and Shari for joining us on The SRI Homeroom today.

Jennifer Nakamura:

Thanks, Kori.

Shari Gardner:

Yeah, thanks for having us.

Kori Hamilton Biagas:

Thank you everyone for listening. We'll see you all next time on The SRI Homeroom. Thank you for joining us on The SRI Homeroom, produced by SRI Education, a division of SRI. Shari Gardner and Jennifer Nakamura are education researchers with SRI Education. Learn more about them and their work in today's show notes. Find all of our episodes, transcripts, and links to other resources by visiting sri.com/education. You can also connect with us on social media with the links in today's show notes. The views expressed in today's podcast belongs solely to the participants and do not represent the views of SRI or any organizational funder or partner.