**Thinking Outside the Sandbox**

**Episode 2: Technology**

Welcome to Thinking Outside the Sandbox, a space broadcasting UBC professors from the Faculty of Education, sharing their knowledge on interdisciplinary learning and teacher education. This podcast is brought to you by Scarfe Digital Sandbox. On behalf of the Scarfe Sandbox team, we acknowledge and thank that we have the opportunity to conduct our work on the traditional ancestral and unceded the territory of the xʷməθkʷəy̓əm (Musqueam) People.

Hello everyone and welcome to today's episode, in which we will be exploring the use of technology to engage learners and enhance our teaching practices. When speaking of technology we will be moving along these five points:

* One, computational participation, a way to think and learn in an interdisciplinary way.
* Two, examples on how video games are being used inside the classroom.
* Three, technology as a tool for teachers to share knowledge with students and other teachers.
* Four, the possibility for online platforms and the virtual world.
* And finally, closing with number five, technology as an example to intertwine art and science.

We interviewed most of the professors we're listening to today back in February, a month before the world shifted on its axis, and many of us turn to technology for remote teaching and learning. Our first speaker is Dr. Jen Jenson, Professor of digital languages, literacies and culture, and has taught in higher education for the last 20 years, focusing on the areas of technology, digital games, and learning. When we asked her about interdisciplinary teaching and how it relates to technology and education. to answer our question, she introduced us to her own field of study and talked on a concept called computational participation.

 >> So the idea for a computational participation model, is that we construct opportunities for students to actually work with. And you use code or to understand what code does through opportunities like making video games. Video games a really fabulous vehicle for understanding what code does. And the cool thing about video games, as they're inherently interdisciplinary.

You actually, in order to make a game, often you need graphics, so you need artwork, you need sound, so you need and music. So you need to know how to compose stuff if you're gonna do it originally. You need to know how to code. Sometimes you even need to know... some engineering and physical physics concepts, so it's really, really interdisciplinary. Oh, and I forgot narrative. You also need narrative. that's really important!!! So all of those things come together in video games and they're in this fabulous interdisciplinary vehicle for understanding what coding is, but also what really, what is the number one media form of the 21st century, which are, is the video game. >>

Because creating video games sounded like an incredible vehicle to deliver interdisciplinary thinking and learning. We asked her how schools were incorporating video game making. To our surprise, Dr. Jen Jenson herself has been going into schools and working directly with students. This is what she had to share with us: <<So my work involves researching the relationship between building video games and and the acquisition of STEM-related competencies. So science, technology, engineering and math. And in doing that, the research that I've been doing entitled: Think, Design, Play. Takes video games into schools, or sorry, it takes technology into schools and asks students to make video games. And what we wanted to find out is, can we support the acquisition of actually algorithmic know-how, which is just understanding what algorithms do, but also what computation does. So computational know-how, and can you get that through the building of a video game? So we take the equipment into the schools. We're working with grade six classes. And at the end of every single one of these interventions, we have a, we have a night where we bring all the students together and we invite their families in, in these inner city schools. And like a 150 people show up and then the kids show their games then everyone eat pizza. Well, in doing this. And this isn't once, it has been now at least I'd say a dozen times. Parents have come up to me and said: what my son or daughter did in the program that you delivered in those two weeks? They've been making video games at home. They've been obsessed with making their own games. And this is the best thing that's happened to them all year. And so for me, it's a fabulous thing where school goes home and the parents get to be really enthusiastic about what, about what their son or daughter is doing. >>

After listening to her talk on the effect creating video games had on younger students, we asked her for more examples on interdisciplinary teaching and the use of video games. She answered that there was possibility to bring in diverse perspectives and voices, and narrated the story of one of her own students.

<< I have a former PhD student just graduating in December. And he teaches at an all-boys school in Toronto. And he, he used Gone Home in his class as a way of actually talking through coming out stories. And he's done a really great school where he talks about how these young men feel comfortable in this all-boys school to come out and gone home was a way of them engaging with that. He also, for his PhD work, had his students play Grand Theft Auto Five and worked with them through the, the racist, sexist, misogynist content in that very, very popular violent video game. >>

As Dr. Jen Jenson and just said, technology is a wonderful tool to gain access to conversations between learners and teachers around diverse topics. Speaking of gaining access and sharing conversations, I'm excited to introduce Dr. Marina Milner- Bolotin, associate professor of Science Education and the Department of Curriculum and Pedagogy. She's a math and science teacher of more than 20 years and has been teaching K -12 as a secondary teacher for the last ten years. She has also taught in informal science education settings, including an out-of-school program for gifted children. Dr. Milner-Bolotin is the only professor that the interdisciplinary Podcast team has interviewed remotely during times of COVID-19, It is for this reason that her examples focus on the use of technology as a tool to explore and share the world, and to see things we cannot see otherwise.

<< I think of technology in Vygotsky and sense, for me, it is a tool that mediates my exploration of the world. I can use those tools and I think of technology, magnifying glasses, technology. Now I don't see so well because I'm staring at my computer all day long, so I had to get a magnifying glass. But there are a lot of other tools that help us see things that we could not have seen before or investigate or to ask new questions. And that's how we use technology with my science students, for example, we use a lot of tools that allow us to collect data. And that's my way of connecting science to everyday life. So for example, when I grew up, I keep going back. We didn't have those tools, especially in the Soviet Union. So we did, I did not know what was your experience, but we did a lot of abstract experiments. Or they would tell us, if you want to do this experiment, you could have seen, or some smart guy has shown that this works this way. Or some other person showed that. We had very basic things. Today we're very lucky that a lot of us have smartphones in our hands. Those tools are available, let's say no to most students, but to many students. And those tools can be used to make those connections that were difficult to make before. For example, I recently my physics methods courses when we were investigating how we can use slow motion videos to see things that you could not have seen before. So for example, we were investigating oscillations of different things. When things vibrate, they do it very fast. For example, when you play guitar, you cannot see with your eyes the vibration of the string. But today you have the tools to make it visible. And I kept asking myself, I'm a very hands-on person. I love experiments I love doing things. But I was asking myself, what can we do with technology that will allow me to help my teachers? As a teacher, you observe them but you forget how do I make it? I remember I saw something but I don't remember how to make it happen in my classroom. So we realize we can use technology: Camtasia, a movie editing software available to our students, at UBC, and some background in terms of as a science. Science and math teachers, we know how to explain those things. It we created videos that parents and teachers can watch and do those experiments at home. So for us, technology clearly was a tool to share our knowledge with others. And we have experiments that now we're watched more than 20 thousand times. So it's not just our students were watching people all over the world. >>

Building from Dr. Marina Milner-Bolotin´s words, technology becomes a tool that allows learners and teachers to access aspects of the world that would remain far from us otherwise This reminds me of a similar idea that was shared by professors Dr. Sandrine Han, associate professor from the Faculty of Education, curriculum and pedagogy, who specializes in art education. Currently, Dr. Han´s research focuses on visual culture, virtual world, and how to apply virtual reality to art education. Previously, in the interdisciplinary podcast chapter on outdoor education, we shared her vision for a virtual platform where people from around the world would gather, discuss, and solve real-world problems happening across the globe. Today we're excited to share another fragment of Dr. Sandrine Han´s interview, and what she talks about the possibility of a virtual platform, such as the one she envisions, and how it would transform education as we know it.

<< So in my imaginary world, is, there is online platform. Everyone can be a scientist or social scientists. It doesn't matter. They just come to the online forum. They give it their suggestions, solutions, and all those people, the scientists, they are students, high school students. They come, coming together. They are not competing. They are, they can vote for each other's comments. Maybe they say: ah wow! this sounds like a good solution! but I have another way of thinking! Let's see, would that work? So they can have multiple solutions to one problem. So yeah, this is my imagination. I think this can be a very good interdisciplinary example. And this is real life. And people will feel connected because this is our neighborhood. So in each country, for example, the place they got forest fire, how are you going to resolve that? How are you going to save the animals? How are you going to save the human beings? Yeah, the social impact. How are we going to help them? All these things! Why not we have a platform? Ask all the students coming in, give us some suggestions. I never ignore the student's voice because they always have like crazy... But maybe useful suggestions for us. Right? So yeah, I think if the if the government, if the schools are willing to open their ear. They might be able to hear something amazing for the young generation. >>

As we've been listening throughout the program, technology plays a crucial role in bringing diverse voices and ideas into interdisciplinary learning. For our last example on the use of technology to engage students and teachers. We share part of Dr. Sandrine Han´s interview narrating the lovely story of an elementary teacher who took her students around the solar system without leaving her classroom. <<So I will use one of my students as an example. She created a science world. At the very beginning, she say I will make solar system. Have all the students sit in the Space Shuttle and we travel around the solar system to see the world, to see the solar system. I say " That sounds cool!" "very cool, because that's what we cannot do in real life." But I say, "Can you think more differently?" Try to put art first and see what will happen. She's a very talented artist and also a student, science, science teacher. So why she come back to me was every student at the end need to choose a planet and make an alien who is able to live on the planet. That their ways of looking need to be able to live in a planet, for example, if they live... not Earth \*laughs\* Yeah, yeah, Venus! that is very close to the sun. So they might have very thin skin, they might be very burned. And so I, I guess if I choose the one that live on a little bit further away and that's a very cold and windy place. So everything is like furry and flying. And because of that kind of environment, so I created the thing, the art piece. And then finally we have an art show. At the Art expression, every student needs to explain. Which planets? This alien is from and why? So this way of thinking is deeper, is not just about: "Ok. Mars is the fourth planet from the Sun and then... yeah." Yeah, I remember all that. So what !? Yeah When art is imbedded in the in the curriculum? It can make things much more meaningful. Yeah, maybe scientists think that's nonsense. There's no way anyone there will be alien. Yeah, we know that! of course! But when student is having the imagination to think about the possibility. And to make sense. I think the most important part is to help people to make sense in different ways. And that's a real understanding. So yeah. Does that science teacher, she was amazing. She made the art piece in there. She made the texture, she made the lights, she made the script. And then she even made the gravity and all those, the wind! The dragon! Everything! she imbedded in the world. That's maybe, as a visitor you cannot see what she had done, but as herself, she need to learn those to be able to make it happen. >>

Professor Han´s beautiful story inspires us all to think on the infinite possibilities that technology and art can offer us teachers in order to create different learning activities that relate to our students. If you wish to know more on learning an art, we suggest you tune into our next episode to listen for more on the opportunities art can provide to reach and engage learners.

On that note, we come to the end of today's episode on technology, and would like to closer podcasts by thanking. Dr. Jen Jenson, Dr. Marina Milner-Bolotin, and Dr. Sandrine Han for taking their time and sharing their knowledge on interdisciplinary learning and the potential for technology inside the classroom. Also, we gratefully acknowledge the support of the Teacher Education Office, CTLT, Work Learn UBC and the financial support provided by UBC Vancouver students via the Teaching and Learning Enhancement Fund.