Trades Summit Series: Strengthening Teaching and Learning for the Future
Connecting Theory to the Shop/Lab Environment to Enrich Student Learning
BCcampus: November 24, 2022, Day 1
Speaker: Ryan Buhler
Host: Tim Carson

TIM CARSON:
I want to introduce you to our last panel session. Last session of the day. We have Ryan Buhler, and his topic is Connecting Theory to the Shop/Lab Environment to Enrich Student Learning. Ryan Buehler is a curriculum and instructional specialist for the Northern Alberta Institute of Technology. He is an experienced steam fitter and welder journey person and educator who has a passionate curiosity about how students are learning in vocational trades education. His curiosity about student engagement led him to his master's in education through the University of Alberta. Non-professional interests include passions for many nerdy avenues, such as Star Wars, Lord of the Rings, and horror in general. Interesting. He has three tiny humans. Good, two ridiculous dogs. Yep. And a loving partner. That's amazing. So please allow me to introduce to you Ryan Buhler.

RYAN BUHLER:
Awesome. Can everyone hear me? Okay. Awesome. Actually two of my tiny humans are home sick. If I'm slightly distracted, I apologize. Oh. So I guess I'll jump into. Or am I supposed to wait till one in Alberta? I'm all confused with the time. That's okay. Perfect. Can everyone see my screen? I like it.

Okay. Welcome everyone. As mentioned, I like to talk about the student experience. When I taught in steamfitting and plumbing programs at NAIT, some of what I was taught when I went through was still being taught in the same way. And so I'm always interested in learning about new ways to engage the students, new ways to look at stuff, new and just how to connect better, how to connect that experience. So I figured this might be something to look into. So I created a Prezzi for this because I like that it moves. I tend to pace a lot when I'm doing , when I'm teaching or doing workshops and standing at my desk. So I have rolly chair for consolation. Yeah. So welcome. Thank you for joining me. Just for participation in this. I do have the chat open. So if you want to join in, feel free to participate through the chat. Or if you just want to unmute and ask a question, raise your hand. For the live participants. I can't actually see the live participants, but if anybody has a question, I'm assuming that Tim will go round and hopefully repeat the question. And we can join in that way because it will be a bit. I'm hoping for a bit of a conversation. So let's start off. I just wanted to check. I was originally going to ask where people are from, but we did that this morning. So I was just wondering, what role are you currently involved in with your institution and sometimes we have many hats. But I was wondering by show of hands, or if you want to put this in the chat as well. Who is in a current instructional role? Who currently teaches in a program? A couple of hands. That's awesome. What about instructional support? Like myself, curriculum instruction or I heard there was some educational developers and learning design people who supports the instructors in their

role. Awesome. And then lastly, I've heard that there's some leadership, school leadership and associate deans, deans and other kinds of roles. Maybe directors. Did I miss anybody in this? If I do, I apologize. I was trying to go for big buckets. I like to think that most, if we're not directly instructing, we're supporting instructors even in leadership roles and stuff like We'll jump on this.

If you're wondering, curious for the picture. I am the big fellow on the far left. Just so we don't confuse. I would like to start with a land acknowledgment. I would like first to acknowledge that I'm presenting as a guest on the unceded traditional territories of the Musqueam. Squamish and Tsleil-Waututh Nations. For those of us joining virtually. I also want to honour and acknowledge that the land on which we learn, work, and live is situated on a variety of traditional Aboriginal People's territories. I myself, I'm joining from Treaty 6 Territory. Specifically, I work in the city of Edmonton, traditionally called Amiskwaciy Wâskahikan. I know that if somebody had mentioned they were from that area as well today. There's a long history that has brought us to be on this land. And we seek to learn from the history and the lessons that have come before us and to draw on the wisdom of the First Peoples in Canada who have lived on this land from time immemorial. Through this land acknowledgment, we have an opportunity and responsibility to reflect on the impacts of colonialism historically and currently. And only through learning can we afford a truth and reconciliation and to better a future together.

To start off, I have a message from a Ministry of Education.

[VIDEO PLAYS]

HERMIONE:
Nothing in here about using defensive spells.

RYAN:
I know that the sound can be a little bit hard, so please let me know if you can't hear at all.

[VIDEO PLAYS]

UMBRIDGE:
I can't imagine why you would need to use spells in my classroom.

RON:
We're not going to use magic?

UMBRIDGE:
You will be learning about defensive spells in a secure, risk-free way.

HARRY:
What use is that? If we're going to be attacked, it won't be risk free.

UMBRIDGE:
Students will raise their hand when they speak in my class. It is the view of the Ministry that a theoretical knowledge will be sufficient to get you through your examinations, which after all is what school is all about.

HARRY:
And how's theory supposed to—[VIDEO STOPS]

RYAN:
So with that in mind, with what school is all about, we'll move on to the rest of this presentation. Those of you who've never seen the show. The lady in pink is the main villain. She's just terrible all around. And her message that the only reason for school is to get people through exams isn't something I personally believe that.

So to start off, I've got a comic here. It's a Calvin and Hobbes comic by Bill Watterson. And I've taken the text out. And so I'm wondering, if you look at this panel. Can anyone want to take a guess at what's happening within this comic strip? Feel free to throw it in the chat or if you want to unmute and talk about it. But I'd like to get a couple of ideas onto what we think is happening. Possibly got surprised. Quiz miscommunication, Frustrated, needing to read on his own. All we know is he doesn't seem too happy. Been asked to read out loud, doesn't understand. I think a lot of us are pulling from. I know personally this is bringing up some emotions when I went through school. All of this. So what's actually happening in there is Calvin's thinking to himself at the desk. I wonder how long it's been since I last looked at the clock. Maybe it's been an hour. Well, actually it's probably been only 40 minutes. I'll guess half an hour to be safe. Then he looks around, freaks out 20 seconds?! It's going to be a very bad day. And then the teacher in the corner, Miss Wormwood says, Calvin, sit down. So I think we all can relate to that one as well. But the point of this comic strip is without that text, that context, we can interpret this in a lot of different ways. I like to think about this comic strip as shop in theory. Where a lot of times we talk about using that theoretical knowledge in the shop space. We're preparing them to be able to do these practical activities. And they need this theoretical knowledge. But if we're not very explicit about where they're going to use this for making these connections, sometimes the student doesn't really understand the full context of what's going on or why it's important for them to learn this.

My lesson objective. By the end of this session, you should be able to identify and discuss ways to use it in the shop environment to introduce and reinforce theoretical value. This comic is by artist Brian Kessinger. And the dad said, you know, he gets this from your side of the family. Calvin and Hobbes references Star Wars. It ticks a lot of my buckets. Awesome. Any questions at this point? I can't see the live group, so I'm assuming everything's cool, I'm staring into the void and that's okay.

So what I would like to do next is to hear from you. I would like you to go to menti.com and put in this code: 5477 9720. Because I want to hear from yourselves and from your experience now

understanding that some of the audience isn't in an instructional role themselves. But if you are supporting instructors in an instructional role, do you advocate for covering theory in shop classes? Or if you're one of the learning designers, do you look for ways to engage students in theory while they're in the shop space? Your options are Oh yeah, Nope, Or Sometimes Awesome. Looks like there's a good chunk that yes. Theory is being covered in those shop spaces, whatever those shop lab spaces look like, sometimes and that's it for a lot of what we do. It depends on the context, what we're trying to get across, and also our shop spaces. And our shop times can be finite as well. That's amazing. Thank you for that.

So my next question, thank you for those who've gone on to answer. If you do cover theory in the shop, how, what are ways that you get the students to engage? Introduce or reinforce theory in that shop environment? So here we've got whiteboards being used. Supplementary videos. Reaffirming what they've learned in theory already and demonstrating. Situational theory, learning blends in practice. Explaining tasks by demonstration. Referencing the text. Perform the same task to answer questions. Group session class demonstration. Discussion of readings. Using QR codes on the machines/tools/equipment that links to relevant theory, or is that safe working practice? I'm just double-checking. That QR codes is a cool idea. These are all great ways to engage, but that's definitely a new one for me. Demonstration whiteboards. Small group discussion research. Does anybody want to build off what they're seeing here? Or does anybody want to ask more questions? Feel free to unmute. And if there's something there that you would just want to talk a little bit more about. Or if there's something that you've posted that you want to add context around please feel free to do so. I've been told it's good practice in an online setting to wait 30 seconds after posing a question, give people an opportunity to type or move on. I usually fill that time by finding a gif of Jared Leto from 30 Seconds to Mars because that's like 30 seconds, but I haven't figured out how to use gifts in Zoom yet. Just rambling until I figure time is up. Awesome. Student-created documents. So I'm going to ask because I haven't heard it before for whoever put the QR codes in. I'm just wondering, is that something that you developed? And also how do you, how do the students react to it? If you feel comfortable sharing.

PARTICIPANT:
Hi Ryan, I'm not sure if you can hear me. It's Cora here. I was the one that commented using the QR codes. So it's kind of used inconsistently. At this point, some of our trades areas are using it more than others. Our carpentry and cabinetry, shops seem to be really taking it on. And they're also using it. Our safety department is increasingly using it. And so we're in the midst of a rollout where they're trying to use it in all of the shops on campus to be able to share our safe work procedures. Instructors are loving it because it makes it so much easier to keep those documents up-to-date. They don't get lost. Swept up on the floor kind of thing when it's time to clean up shop or in the way with machines. Students seem to be responding quite positively and it's a great way to create an opportunity for students to be able to use their technology in a positive way, right? Trying to get away from phones away in class and just embracing it and using those phones as a learning tool. So they seem to really enjoy that.

RYAN:

That's really cool, That's awesome. Bring something back. Oh, thank you so much, Cora. And then I had a question for who put in the students created documents. I just wanted to ask if you're comfortable sharing, what kind of documents do you, either you or the instructors get them to create?

VIDEO:
Can you hear me? My name is Jessica. Hi. My example is, instead of going over the theory first is to, and my classes or outdoors typically, and in the case they create a shared herbarium of plants. And so they're actually creating a class book of live specimens.

RYAN:
Well, that's awesome. That's so great. Like all of these are such impactful ways to get students engaged, sharing, building in that context. Because a lot of the trades that we teach or work in are really varied and fast. And if students don't have a specific experience, or opportunity in their apprenticeship, it might be harder for them to make those connections. So us doing some of this makes them more intentional, really helps to bridge that for them. I love all of these. These are great. Did I miss any? I didn't know if you clicked on Mentee but it glows up. The thing you clicked on. That's amazing. We are learning today.

And then the last slide I have here, just for this section, I'm talking about it. And some of that's already been touched on a little bit. What are those things that worked well about connecting the period with shop? But then as well, what are those challenges? Because like anything, for a lot of our practices in education, there are things that we would like to do, but there's always going to be drawbacks. What might those be as well? So we can identify them to talk about them. I like this first one here. Having a schematic on the whiteboard. It becomes a competition. It's almost that gamification. Where do you get that, bring out that competitive edge in the students, similar to Kahoot, because they want to try to track it down, find these things, meet their mates. Anything else? While you're thinking of something to add, I'm just going to mute myself for a second. My little tiny human. Think-pair-share. That is an excellent one. Students see how theory and employability skills are interconnected. The challenge is making theory engaging and interesting, That's always it. It's hard, especially for a lot of our students that are very tactile. They want to be doing stuff, especially if they're in an apprenticeship program where they work 8, 10, 12 hours a day, standing up, moving around and stuff. And then it's like, hey, we want you to sit down in a classroom for 6 hours a day while I talk at you. It can be very hard to engage them. Availability to shop, definitely, It's a finite space. Finite resource time. Demonstrations work really well, Having enough equipment as well. And then there's also that safety aspect. Safety plays a huge role. Awesome. Does anybody unfamiliar with the term think-pair-share? It's the idea where a question is posed. You have a little bit of time to think about it. Then you get together with somebody near you and you discuss that question, your thoughts on it. So that's a good way to engage and making sure that it's not just one person participating in a discussion, but everyone's participating with each other. Case studies, case studies are really, can be a strong way to engage students. If we lay out a scenario and have them explain what they would do or what should be done, or how to walk us through a process. At first they find it's a better register of their understanding than

they pick B on that multiple choice test. They must know it. I'm slightly biased. Any questions? Does anybody want any clarification on here? Or something they want to add? Maybe you just don't want to type into your phone. Feel free to shout it out. Mostly good. I like it. Okay. Are you planning to share a PDF of my slides? And also, I will try to remember to include these as well in case you want to take a look at this at a later date, I just find it interesting.

Okay, back to this. Okay, so I like to use cartoons. But there's actually people that are experts in research and education that do talk about this. There's times where, I've been guilty of it too. We have so much content to get through in an apprenticeship-style program, we just vomit out the theory onto the students. There's often such big chunks. And we need to make sure that we embed it in the practice so that they can make those connections. We want our learning to be more authentic. If I say that I'm preparing a student to be a plumber, and my assessment is that they got a good job on a multiple choice test. But they don't actually have, but they didn't do as well actually putting together the PVC pipe and gluing stuff together, there was other stuff like that. We want that. What do we need to prepare them for in the classroom here if they're going to be doing it out in the field? That's the big thing about this. And to help our students engage with some of that stuff is to pull on their experiences or if they don't have those experiences in themselves, we have to find ways to build those experiences in which a lot of times is the shop or having peers share between each other. And we want to make sure. It seems like this group is very strong on the idea that these things can be together. I know I've met and had conversations with some who see this by the church and state. This is theory, this is practice. And we don't cross the streams. But it's important to make those connections.

So here's some other examples. We've had some really good ideas and most of these have been talked about already. And so these are just easy ways to get the students engaged and with the theory in those shop spaces, in those contexts. So one of the easiest things to do is just to ask probing questions when you're in that space. And it tends to happen already, just making sure we're more intentional about it. But if we're asking a student, what's the next step in the process? And they showed it out. A lot of times we're good with that. That's all we wanted was that rote memorization. Maybe asking them why, why they think that's the next step to explain the reasoning behind it that reinforces it. Or gives you the opportunity as the instructor to identify where maybe there is a flaw in their understanding or something that needs to be corrected or adjusted. The other thing too, that I really like about that is I might explain something to students in a certain way. And just, for some of them, it just may not click. And then all of a sudden you get a peer explaining it in their own words. And that student who didn't click before just gets it. Because it was their peer explaining it slightly different or sometimes in the exact same words. The other thing that was already brought up is discussions, having discussions about the equipment, about the processes, about the scenarios and the case studies in that environment. Because they can see the connections there. They're holding the equipment. They're moving around and through it in those spaces. The next one here is student investigation. I love this one. I used to do a project where I had an actual pirate map and it had a bunch of spots the students have defined. And they would take their module into a boiler room. And then they would use the map to find the points that I had identified. And then they had to use their module to read about that specific section, about what that piece was. What it

did, what's important. And we used the mind map and some other things, but that idea where they're wandering through, finding stuff, engaging with that stuff. Instead of just seeing it as a picture can be pretty impactful. Something in the chat here. During the pandemic when students were learning remotely, one of our automotive instructors did a real-life case study with the students. The instructor would start and ask the students what they would do to troubleshoot and determine. He took recordings with his phone and do their suggestions. He posted it. That's amazing. I really like that. Another thing that's nice about that too, Cora, I think, is that too often in school we have this mentality. and our students have it too, where they can't make mistakes because they're being assessed. Marks are king. But if you show them, Hey, we're troubleshooting, what do you think will happen if we do this? Let's try it out and see what happens as long as it's in a safe, secure environment. We don't want them testing out their parents, or testing out and replacing the brakes in the parents' vehicles without much training. But something like this I think is a great way to get them to see that critical thinking. Let's work through stuff which is awesome. Yeah, we learn a lot more from those things that we messed up. Then what went smoothly because sometimes we don't even know it went smoothly that first time on that.

That's awesome. The last one kind of ties a little bit into this. Those involved demonstrations where either the instructor is demoing and having the students, like you mentioned, core walking them through the steps. What's the process moving forward? If it's safe to do so, making the mistakes and the students are seeing what's going to happen. And then building from there. Or on the other hand, having the student be the hands of the demo and instructor walking them through. What's the next steps? One of the hard things about that is any demonstration. It can be hard for other students to see what's going on at the same time. Any questions now? Anything somebody would like to add or poke at or share what they've done or that some of their instructors have done, that they think were a great way to engage the students and make impactful connections.

PATICIPANT:
So something that I like to do in my lab is we do fire alarms circuits and lots of troubleshooting on different types of circuits, but particularly with fire alarms. Part of the analysis is you have to learn how to troubleshoot them and find out where the problem is. So I will have the students be pitted against each other. So they have to investigate. In an involved demonstration that they have been involved in creating. Sometimes, right? So it's kind of a competition to see who can trick the other students the best. And they have a lot of fun with that, putting problems into each other's circuits and then that way they know what to look for in the future. If they've got a shorted smoke detector or a heat or what have, they can know what to look for because not only did they put one in somebody else's circuit, but then they had to solve for their own. And that becomes very interactive and works really well in the lab setting.

RYAN:
That's awesome. That's a great way to do. That troubleshooting too. We want those students to feel comfortable. Trying things out, seeing what works and what doesn't. Feeling that they're supported. And they probably enjoy putting thoughts into each other's projects I imagine.

Sorry, I was trying to mute my Teams notification. That's awesome. So one of the things here, I do have some resources and they'll get shared out with the slides. But also I just want to mention there's a lot of different active learning strategies you'll find online. And most of those can be adapted in some way for the lab and shop environment. Good way to explore good student engagement in a big vote for any of this stuff that you do is to look to that student feedback. When you're trying these activities. When you're doing something new in this environment to engage students a little bit more. I'm sorry about my case notifications. Ask students how it went. What worked well for them. That can really help. And being open about why you're doing these things, why you want to make these connections. So they started looking for those connections too.

The big thing is don't leave our students hanging. Theory and shop are important to bring together. I'll just go to my last slide. I just want to thank everyone for attending this session. I hope you enjoyed it. I hope you got something out of it. I apologize for not taking full time, but now, I figure I'll leave it open at least for a little bit. If anybody has any questions, comments, or things they would like to share.

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