

Christopher Richmann: Welcome to Professors Talk Pedagogy, a podcast from the Academy for Teaching and Learning at Baylor University. I'm your host, Christopher Richmann. Professors Talk Pedagogy presents discussions with great professors about pedagogy, curriculum and learning in order to propel the virtuous cycle of teaching. As we frankly and critically investigate our teaching, we open new lines of inquiry. We engage in conversation with colleagues and we attune to students' experiences, all of which not only improves our teaching, but enriches and motivates ongoing investigation. And so the cycle continues.

Today our guest is Dr. Michelle Herridge, post-doctoral fellow in stem education with the Academy for Teaching and Learning at Baylor University. Dr. Herridge has earned her PhD at the University of Arizona in chemistry with a minor in teaching and teacher education. She has worked in discipline-based education research since 2013 and has a BS in chemistry and a BS in sociology from Clemson University and an MS in chemistry from Missouri State University. Her research explores assessment and instructional practices, primarily in chemistry education and professional development for graduate teaching assistants and new faculty. She has taught in a variety of courses including Baylor Interdisciplinary Core's Natural World Sequence, a science and integration course for pre-service teachers and a team taught course on feminism. We are delighted to have Dr. Herridge on the show to discuss recent developments in discipline-based education research, what excites stem college instructors, and what it's like to teach outside your area of expertise.

Alright, Michelle Herridge, Thank you so much for joining the show.

Michele Herridge: Yeah, Thank you for having me.

CR: So you are our current post-doctoral fellow in stem education. I think a lot of listeners, especially those who come from stem fields, will have a pretty good idea of what a postdoc, post-doctoral fellow is in their fields--Someone continuing research, working hard in the lab, but a postdoctoral fellow in stem *education* is something different. So what do you do here? What have been the major projects that have kept you busy now for two years?

MH: Yeah. I think that there's a lot of overlap in terms of continuing research and getting to know a little bit more about what the future might hold and what is interesting to me. So the thing I'm most proud of in the past two years has been the stem Education Journal Club, which is a group of us that meet from all of the different stem disciplines every other week, we read a journal article and then we talk about it. And there's plenty of fetching about what's going on in our classrooms, how our students are doing. But also really thinking about what's the evidence and what's the research that's out there for us to try to implement in our classrooms. I've also been part of grant writing projects and helping out with the, particularly the biology labs, revamping classes to engage in evidence-based practices. Doing lots and lots and lots of observations and seeing how stem professors, but all professors at Baylor or some of the professors across disciplines are teaching their classes, how we might support them in engaging in those evidence-based practices and bringing them to students. As well as doing some teaching in some new courses and teaching cross-disciplinarily which has been a ton fine. But really, I am here as a resource to provide professional development, engage in sets, support the ATL, how I can, and bring that stem background to this group.

CR: So we've worked together on teaching observations across campus. So I'm wondering what your take is on what you see are differences in disciplines about how people teach. What are some default modes in teaching, because that's the one area in your work where you've been stretched a little bit outside of the stem bubble?

MH: Yeah, absolutely. I think thinking about the observations that we've done, the difference largely seems to be in the type of information that students are asked to know or to learn. So in my mind, a lot of stem has, sometimes, there's this list of facts or this list of ideas that we then put into practice and engage in application. And really a coherent model that is transformed for our students here is how this cycle works, or here's how this reaction happens in chemistry. Whereas in some of the other disciplines, it is, seems to be, You still start out with a List of facts or this list of information, some reading. But then introducing, how do you leverage that into argumentation or how do you form opinions based off of this? So the real difference to me, while you can use active learning in both of them and you can use evidence-based practices no matter what your field is, the difference really comes to me between the content versus the structure of how it's delivered and thinking about, are we focusing on how these pieces go together or how do you engage in the building of it itself?

CR: yeah. And I'm gonna, I'm gonna come back to what you may have learned about teaching a humanities course as well speaking of getting, getting experience outside of the stem bubble. But when you were mentioning the journal club, I've heard you talk about this. I haven't attended any of these, but just the robust discussion that you're having in these, in these reading groups where you just take a, take a piece of recent literature in the scholarship of teaching and learning or discipline-based education and talk about it and apply it and see what comes out of that. So I'm interested, especially from those journal clubs, what you're hearing from faculty that excites or motivates them in their teaching.

MH: Yeah, I think the thing that's most exciting is, oh my gosh, I'm not the only one with this problem and they figured out how to fix it. So I think the most exciting part is not just the, there's really great research. There's a lot of interesting research out there, but this idea of getting excited, because there is validation of our frustration as instructors and as professors and recognizing that we are not alone in problems or struggles that we face. And that there are many, many different ways to approach solutions to those. Leveraging your students, leveraging the people in your department or in your field, finding ways to address those frustrations or hiccups in this didn't go quite the way that I planned it. How do I get back on track? So what's exciting about that is that no one feels like an island. And I think that sharing of resources, we have, I believe it's seven different disciplines that are represented in our four different sections. And so having that cross talk of, oh, I'm in geology, you're in biology, but we're having the same issue, helps us find things that are Baylor solutions, but are also solutions. Maybe from chemistry, they've tried something and it can be applicable in other spaces. And that seems to be the most exciting thing for a lot of the people participating in that group.

CR: Yeah, it can be. I don't know if you've experienced this working in a center for teaching and learning as you have, but it can be important to remember and kind of surprising that faculty often don't talk to each other about their teaching because this is what we do every day. We go out and talk to faculty about their teaching. But it's so helpful to be reminded from these faculty that they go to their class, they shut the door, they don't get a chance to talk about it oftentimes in department meetings or things like that. And so any development that's happening, they have to seek it out usually or it happens because of spaces that have been created outside of their, of their departments. So let's talk about some of those problems. What are the challenges that faculty have, especially coming in, in the stem fields in their teaching.

MH: I think that a lot of the challenges have to do with the expectations for pacing and the idea of how we learn in those classes, stem teaching is definitely slow to change. Active learning papers started coming out in the '90s and here we are in 2020, 2023s. And thinking about this paper came out almost 30 years ago. Why aren't we doing this? Why is it such a small group of people who are engaging in these new practices? It's because it's hard. It takes a lot of time to think of how are you

going to implement these changes. It's a lot of effort to not just take a textbook and read from it. And so I think the challenges in stem are the same challenges as any other discipline. In insofar as it takes creativity, it takes time. We're overloaded with a number of classes that we're teaching. The number of students in each one of those classes. Stem courses can easily be 100, 200, 300 classes. When you have such a high volume of students, it can be that much more difficult. And if something doesn't go right, it feels so much more stressful. So I think the challenges are around finding supports, finding things that are going to work on the first try, knowing that that's an unrealistic expectation. It can scare people away from it.

CR: Yeah, I've heard more than one faculty member saying, Oh, I tried flipping my class and I think they usually mean like I did at one semester and it was really hard or it didn't go exactly as I expected, and so it was easier to just default back to what I was doing before.

MH: Absolutely.

CR: Yeah. So the dimension of the pace of change in our teaching brings to mind something that I think about a lot, which is the tension between the slow pace of change in college teaching and conversely, the speed of development in the scholarship of teaching and learning. And so like any other field, when, when, when people are taking a scholarly approach to studying, Teaching and Learning or discipline-based education, things are going to move and develop. And what was the hot new thing at last year's conference is not talked about anymore. I think about this with like flipped classes again, I was at a conference two or three years ago where one of the plenary speakers made a point to say, I didn't see any sessions at this conference on flipped learning. And four or five years ago, it was like 40% of the session. And yet there's faculty who have never tried it, don't really understand it, who may have heard this or that about it. And there's this tension where it's like some of these really good things Never get a chance to land with faculty because the field of the scholarship is moving on. Any thoughts about that? That was just kinda out of the blue though as you were talking.

MH: Yeah. No, I think that's a great point. I think we were talking today, earlier in the stem ed journal club about this idea of "gotta" try it now, how do you know what's going to work? The continuation of we are, as instructors are in fact learning new things. And this idea of having to move so quickly through, Well, what if next year it doesn't work? What if next year...What if this group of student loves it and the next group of students hates it, how do you moderate you're teaching in that? And when do you tell your students this thing didn't work? We're going to try it again, or we're just not ever going to try anything new. And I think that there's a hesitation in teaching because we're impacting the future lives of our students. We think it is so critical that I never make a mistake when I'm standing in front of this class because what if I say something wrong? And that's the only thing they remember? I think there's a lot of validity to thinking about how we're impacting our students' futures. I also think that modeling mistakes and finding new information and teaching ourselves and engaging as whole humans is so vitally important that I am more likely to try something new than to try something that is boring or old or hasn't, has been done 1,000 times before. And I think it's really important to recognize that that's a very precarious place for us as instructors to be okay with knowing that we aren't going to be perfect and doing the best that we can. And making decisions carefully and thoughtfully about what it is that we can retain and what it is that we can change to increase our engagement, decrease our own workload, make it so that our students are learning and engaging in a way that is meaningful to them. And not just this is the way that I was taught there for this is the way that I will teach.

CR: Yeah. I'd like to do more study on this and perhaps even some research on it if there's, if there's room in the literature for it. But oftentimes, we will get asked if a certain thing works and we'll point

to the literature. But then a follow-up question might be, well, does it work when you do it? As if there's a little bit of distrust about the Scholarship of Teaching and Learning. And I've started to rely on the answer of, well, like all, anything that's scientific, we're going to rely on the consensus in the literature and we're going to try it. But on a personal, more subjective level, when you do the things in your teaching, like you're talking about trying new things, being willing to, to model failure for mistakes for students. At least in my experience, the job of teaching becomes just much more enjoyable, much more rewarding when you think about it in those terms. And so, I don't know, maybe there's a study out there that shows like, yes, you can love teaching 15 more percent or something ridiculous like that. If you just let go a little bit, try new things and enjoy that process. So do you have a similar...

MH: I will definitely co-sign That's with you. I would love to do that study. It's such an interesting idea. There's so many articles that talk about the art of teaching.

CR: Yeah.

MH: Then you contrast this with this idea of, well, there's Scholarship of Teaching and Learning and there's all of these discipline-based education researchers. And where is the line between it's an art versus science? And I think that you and I are both very firmly in the camp of its, there are scientific attributes for sure. I think when I reflect on my favorite instructors, some of them were my instructors, some of them I had the pleasure of working with and collaborating with. Some of them I have simply observed. Some of them do just have the magic mojo. And thinking about what's common among them is, they're bringing a joy and a passion to what they're doing. And they are okay with recognizing that learning takes time and that we as instructors are learners.

CR: And it's a matter of, to me, it's a matter of faculty flourishing too, because even if you can look at your week and go wow, if I, if I keep doing the same things that I'm doing in my teaching and don't experiment, then I don't have to do that extra prep and that'll save me time and then I can do more research or whatever the case may be. But I think about the scholarship of like robber boys [?] who found that It's the instructors who don't resent teaching and don't resent the time that tend to try new things and to be a little less zealous about their image in front of students, students willing to make mistakes and things like that. Those are the ones who are successful across the board in their research, in their teaching, in their collegiality. So there's a whole kind of package mentality I think that, that centers for teaching and learning and faculty development workers could, could tap into with that.

MH: Yeah, absolutely.

CR: So let's talk about your teaching here at Baylor. You have taught a just a, an incomprehensible mix of courses. And I love that because when people asked me what I teach, I have to say, okay, well, what semester are we talking about here now because I've taught in three different departments here and so on. So what have you taught here? You want just to list it for us?

MH: Yeah.

CR: And then give some reflections on it.

MH: So I have taught for four semesters here at Baylor. I have taught Natural World I, which is a, it's in the Honors College part of the interdisciplinary core team taught questions about what makes us human and then Natural World II, both of those are for non-science majors. Then I have taught in the School of Education an integrated science course for elementary education majors. And this semester

I'm teaching a senior level course in the interdisciplinary course. And that's on the philosophy of feminism.

CR: So anybody who's taught in the Baylor Interdisciplinary Core can attest to this teaching outside of your area of expertise, because it's by design that faculty get, they get selected to teach these courses because they do bring some expertise, but also a deep willingness to approach the questions in a more generalist way and helping students how to think through things even if you're not the one who's certified expert in it. So what have you learned about teaching that kind of course?

MH: So I will say that teaching outside of a Chemistry department is very different in many ways and it's very similar in a lot of ways. I think the teaching non-science major shifts the focus in a substantial way from no these ideas or these facts or this information to scientific literacy more generally, yeah, I think that there are absolutely skills that I find teaching students that I had more trouble getting to when I was teaching in chemistry. One of the things that comes to mind is writing. The difference in the types of writing, the difference in the assignments. Grading six to eight page papers versus lab reports is a very different experience. So the construction of those papers and thinking about, thinking about thinking really great is it's such a novel experience for me in terms of what are the questions that I can ask my students? Can I ask them to approach this from their own disciplinary background? Can I tap into and if it's a history major, can I say here's how the science plays into the history and here's the reciprocity that exists because those, those connections do exist. And for a long time I was in chemistry departments. I taught exclusively in chemistry departments for seven years. And being forced to think outside of I'm going to spray you with a firehose of chemistry all of the time, and really reaching for the comprehensive nature of what we do has been so wonderful and so pleasurable and really forced me to think about why it is that I love what I do.

CR: So I avoided stem mostly successfully in my college career, my high school career too--I can't believe they kept giving me degrees. I was talking recently with a math professor about this very thing. I took a real generic kind of what's called a problem-solving course, as a, as my math elective when I was in, in college. And I felt like that course really did help me think about, what is math and what is math for in like a very important kind of philosophical way. That on one hand it's sort of like, it's like rocks for jocks, you know, that kind of thing where it's like, well, you're not going to cut it in the high, the high octane math courses. But on the other hand, I think there's a lot of students who pass through layers and layers of those highly technical stem courses. And then at the end of its still don't really understand what is this for? Why, why does humanity do this like on a deep level? So I don't know if there's something there like maybe everyone should take those kinds of...

MH: Dr. Wright is going to love me for saying this. Every student needs to take a philosophy class.

CR: Oh, okay. Yes. And that's...so why do you say that?

MH: So I took a philosophy class as one of my Gen Ed requirements in undergrad. And of course, working in that philosophy of feminism course now, I think philosophy is something that underpins all of our education. I have met with a number of faculty who are pre faculty, grad students, postdocs who are trying to write teaching philosophies. Really at the core of it, any kind of philosophy to me is thinking about why it is that we're doing what we're doing. And I think that that's so incredibly valuable because stopping to think about the purpose of learning this information or constructing things in a certain way, or even going to college in the first place is so taken for granted by some.

CR: Yeah.

MH: I knew that I was going to college and so I went to college. And I remember asking my parents, can I just mangle in general education and they're like, no, you have to pick something. Which is why I think I'm drawn so much to things like the interdisciplinary core or these things outside of my field. But taking the time to take a step back and say, we study history because it gives us a precursor to what can come in the future. We study chemistry because it explains things like fire, and I don't know about you, but I think fire's pretty cool.

CR: We should know something about it.

MH: At the end of the day, education is about asking questions, seeking information to help us explain things. Yeah, and that's true of history, that's true of English, That's true of Biology, chemistry, physics, math. And you made this comment of not being able to make it through some of the upper level math courses. I think that's one of the challenges for stem, is stem has this reputation of it's going to be difficult, you're going to struggle. And I don't think that it has to be that way. But I think that taking a time to say, Okay, I'm teaching introductory chemistry. Why is it that I was interested in this subject? How do I showcase my passion or my interests for it? How do I know? My students are not mini-me's. My students are not going to take the same career path that I am. We don't need 100% of 300 student introductory chemistry class to be a PhD. Chemists, like that's not...But what is it that I need my students to get out of this experience, to go into the world and be productive to be able to answer the next question. We don't know what questions you're gonna be asked in ten years from now. We don't know what questions are going to be asked in five years from now.

CR: Yeah.

MH: So engaging in the thought process of what are the tools necessary? How do I prepare for those? How do I help students get excited about something, almost anything I think is the critical piece there.

CR: And especially in science as helping students to make that mindshift about what science is. And it's not as you were saying earlier, just all of these facts that you that you commit to memory and then plug into some kind of skill or technique. Because, because I'm a historian and I took these kinds of classes, like philosophy of science when I was an undergrad, This is the way I've always thought about science. And I'll tell my students in a history class, going through the scientific revolution, I'll say something like the driver of science, what science is at its core—this is coming from a person who's not a science at the...sort of maybe translate it--science at its core is uncertainty and skepticism. It's trying to prove what that last thing, that perhaps that last thing that we thought was right might not be right. Like that's the history of science is always.... and students just stare blankly at me like no, history is about science is about certainty. Science is about knowing exactly the way the world is like, No, that's not just, you know, it's not really the way that it has ever worked. What we think is settled now will not be settled. At some point.

MH: I think I think that we're moving towards...I don't, I don't disagree with you.

CR: We're could have a really philosophical debate on this.

MH: Yes, we could. I think the core of science is asking how well do we know that.

CR: okay, yeah.

MH: So not necessarily that it will change or that it is unknowable at its heart. But that the questions of, okay, if we take this model to be true, what are the flaws in this model and how do we make sense? And is there a better model that can answer more questions.

CR: right, that's a good way to put it.

MH: So I think that attacking it from that position of how do you ask questions is relevant no matter what discipline you're in.

CR: Yep, yep, Exactly. So let's talk about this feminism course. You came, you came into the podcast studio here fresh off of co-teaching this course this afternoon. So how have you found this experience to be? You're teaching something that is, I don't know if it's completely outside of your area of comfort, but it's certainly if you look at your CV you want one could surmise that it's that it's outside your area of expertise.

MH: I believe that I told the students the other day that the last time that I deeply annotated readings this closely was when I was in AP linguistics and AP literature. So definitely been a long time. It was very nice to dust off some of those tools of critical reading and annotation, thinking about having papers in conversation with one another, which is a very humanities type of thing to say.

CR: Put these two people together in a room that lived 150 years apart.

MH: Yeah.

CR: and have a conversation.

MH: Yes. It's been a lot of fun. I have really enjoyed bringing in as a woman in science. I, my undergrad, masters, and PhD are all in chemistry, being even in physical chemistry, which is even more male-dominated than other sub-disciplines of chemistry, has really been complimentary to how do we view women historically and how has Feminist Thought shifted throughout time. So I think that going into this class, I was very nervous. We have a class and a final left, and I'm still nervous. But I've learned a lot. And I think that it has helped me to find ways to communicate effectively. So as an education researcher, we do a lot of statistics. We have a lot of social science background and reading papers in this class where we're debating things like gender and sex and biologically derived labels. How does that intersect with the rhetoric and how do we talk about those concepts and how do we engage in meaningful discourse about differences in opinion When there's, "here is the set of science and the facts that can be measured" versus "here's how we talk about that." So I really enjoyed it. It's definitely been out of my wheelhouse. But I think that as I have alluded to previously, it's meaningful in a, we need to be having conversations within our discipline and without, between our disciplines. So in the stem-ed journal club, we bring a lot of different stem disciplines together. In this Feminism class, I am working with a lot of students who are not science majors about things that aren't science, but we are still tying in scientific thoughts and ideals. In some of those conversations.

CR: What have you developed in terms of your own teaching techniques in this feminism course that you might be able to, in some way use and in more traditional stem courses?

MH: Yeah, so this is a Socratic style class, so it's lots of discussion. We read things outside of class and then come in and talk about them. I have been a big fan of active learning for a long time now. And I think that student-driven activities and student-driven conversation is a cornerstone. I think that it is more difficult to do in stem because sometimes it's not just. Read this paper and respond to it in an intellectual or emotional way. But I think that some of the things that I will draw

from it is to hold space for both small group and large group discussion. A lot of active learning and stems is focused on the small group activity. But I really like the whole class conversation that we've been having. I think that this is a capstone course for the BIC students. And so there are lots of, lots of seniors. But I really appreciate the relationship that has been explored through some of our papers and activities between what have we read in class, how does this apply to your personal life? So we, I designed an activity this semester for gendered stereotypes activity and said, sometime during the semester, do a masculine activity and do a feminine activity before you go, tell me what you expect if you're anxious about it, what's concerning, how you think it's going to go? And then after the fact, tell me how it went basically. And my students did amazing. They had such great ideas. They really poured their heart and souls into this class, but also trying new things. And I would love to bring that into a chemistry class of hey, when you go bake that thing, stop and think about the chemistry, or when you're cooking or when you laid off fireworks, what's happening? So I think that this transference from, here's what we're learning in class. How does it apply to other areas of your life is really the biggest takeaway that I would hope to take into other classrooms.

CR: That's great. Well, let's talk a little bit about the research that you're doing. What's what's on the docket right now? What are you working on?

MH: Yeah. I'm working on quite a few different things. I think the first thing is that observation project that you and I are working on to think about whether or not when an instructor asked for an observation, what types of things are useful to recommend?

CR: Yeah

MH: What recommendations are taken up and what recommendations are sort of ignored. I think this really fascinating in terms of our work here with ATL and doing those observations of what are the most accessible things to change. What like, sure, everyone can go into, like anyone can tell you to overhaul your entire course and you need to...But how do you make it more straight forward without changing someone's entire teaching philosophy or teaching style. So I'm looking forward to talking more about that and sharing the results of that work. I'm also working with an incredible grad fellow this semester. She and I are looking at graduate teaching assistants and seeing what kind of supports or training they would like. We often, in my case, I was thrown into a lab to teach and said, here's the lab manual, there's the schedule. We have staff meeting once a week. Good luck. And it took me awhile to find my footing and figure out what I was doing. And so looking at the experiences of graduate students in a lot of different disciplines and saying, what are the things that you remember? What do you wish was there? Which I think can be really helpful in designing our programming, but also as feedback to different departments on your grad students might not be telling you exactly how they're feeling. But there's a lot of stress when you teach for the first time and a lot of stress in figuring out who you are as an instructor, especially when you're a grad student and you're still taking classes and figuring things out yourself. Other than that, I am looking at assessment projects. I love assessment. That's thing that interests me. Looking at how we design rubrics and what expectations are set forth in how people rate rubrics. We often think of rubrics as we have all of these people grading or maybe you're grading individually, but you're using some external metric to keep yourself align and on track and consistent between students. And I don't know if rubrics are always what they are anticipated to be. I don't know if they always act the way that we expect them to.

CR: Yeah. Yeah. Fantastic. Well, thank you for all of your work here at Baylor at the ATL. All your collaborations with me, with our colleagues at the ATL with faculty across campus. And thank you for being on the show.

MH: Yeah, thank you so much for having me.

CR: Thanks again to Dr. Michelle Herridge for joining the show today. If you would like to learn more about Robert Boice's work on faculty flourishing, see the show notes on this episode and at [Baylor.edu/ATL/podcast](https://baylor.edu/ATL/podcast). Click on season 3. And remember, the best way to support this show is to subscribe with whatever app you use to listen to podcasts. That's our show. Join us next time for Professors Talk Pedagogy.