Dead Ideas in Teaching and Learning Podcast Series

Season 6, Episode 6: The Science of Learning in Action with Samantha Garbers and Adam Brown

Center for Teaching and Learning, Columbia University

[00:00:00] **Catherine Ross:** Hello and welcome to Dead Ideas in Teaching and Learning, a Higher Education Podcast from the Center for Teaching and Learning at Columbia. I'm Catherine Ross, the center's executive director. As a quick reminder for our listeners in this podcast series, we are exploring dead ideas in teaching and learning.

[00:00:25] In other words, ideas that are widely believed, though not true, and that drive many systems and behaviors in connection to teaching, exercising what Diane Pike called the "Tyranny of Dead Ideas." I am speaking today with Dr. Samantha Garbers, aka Sam, who is an associate professor at Columbia University, Mailman School of Public Health, and Dr. Adam Brown, the program director of our Science of Learning Research Initiative, also known as SOLER. Dr. Garbers is an associate professor in the Hillburn Department of Population and Family Health at the Columbia University Mailman School of Public Health. As a public health educator, she leverages her training as an epidemiologist and decades of applied public health practice to prepare the next generation of public health leaders.

[00:01:21] Her research work is focused on developing and evaluating tailored, context specific interventions that have the potential to change public health practice. Disseminating the findings from this work has focused on providing usable and credible evidence that provides guidance for moving interventions to scale and changing policy and practice. Her academic leadership roles include curriculum director in her department and co-lead of the public health research methods certificate.

Dr. Brown obtained a PhD in neuroscience in 2017 from the University of Chicago, where he also served as a graduate fellow at the Center for Teaching and Learning. He then came to Columbia as an instructor and curriculum developer for the Frontiers of Science, a college Core course.

[00:02:13] Adam joined Columbia's Office of Teaching, learning and Innovation as program director of the Science of Learning Research Initiative, SOLER in 2020, operating at the intersection of pedagogy research and administration. He conducts scientific investigations of teaching and learning and collaboration with faculty across the university.

[00:02:37] Welcome to our Dead Ideas podcast, Sam and Adam, I am very happy to be talking with you both today.

[00:02:44] **Samantha Garbers:** Thanks for having us.
[00:02:45] **Adam Brown:** Thanks for having us on the show.

[00:02:48] **Catherine Ross:** So today we're gonna be hearing about a teaching research project that's being supported by, as I said, by our SOLER office in this Dead Idea season, we've been exploring the difficulty of changing both instructor and student behaviors. You know, behaviors that often ignore and sometimes maybe even defy the large body of learning research that exists. Since Adam is the director of SOLER, he will be my co-host today, and we will be speaking with our colleague Sam.

[00:03:24] And Sam is not only an avid researcher and proponent of the scholarship of teaching and learning, but also happens to be an expert in thinking about how to change attitudes and behaviors and to optimize outcomes. So I'm quite excited to hear what she has to say today. And I will now turn the hosting over to Adam, who will start us off with some questions.

[00:03:51] **Adam Brown:** Thanks, Catherine. So Sam received a grant from SOLER back in 2021 and then again last year. So I've been working with her for almost two years now, and it's been really interesting to see how this project has evolved over that time. So let's start with a big question. How can we get research on teaching and learning to translate into actual change in the practice of teaching and learning?

[00:04:10] And in this case, we're gonna focus on the student side, what students do as learners.

[00:04:18] **Samantha Garbers:** As Catherine mentioned in the intro, I trained as an epidemiologist and in my practice outside of teaching, my work is focused on public health interventions. So designing, adapting, implementing, or

evaluating public health interventions primarily around sexual reproductive health, but also adolescent health.

[00:04:35] And that is the lens that I bring in approaching the science of teaching and learning. So in public health and in the course I teach on program planning and evaluation, there's a very strong distinction drawn between efficacy, the results of an intervention or treatment under ideal conditions, which is usually a randomized control trial and effectiveness, which is the results of an intervention under real life conditions.

[00:05:00] **Adam Brown:** Can you explain to our listeners how these two terms, efficacy and effectiveness relate to this season's theme?

[00:05:06] **Samantha Garbers:** So in previous episodes of the podcast this season, the guests have talked about the concept of legacies in teaching. So creating or presenting a course with lots of readings and dense slides and lecturing because this is the way we were trained. And folks have said that this is a dead idea and a lot of my work is unpacking how a course goes over but from the student perspective. So I would say that my dead idea is that the course as designed by the teacher or faculty is the only version of the course as the students experience it.

[00:05:39] **Adam Brown:** So as I mentioned before, Sam received a grant from Solar to do research on teaching and learning. Can you explain a little bit about that research and how it relates to the dead idea that you just mentioned.

[00:05:50] **Samantha Garbers:** For sure. So my research is really focused on opening a black box of course engagement. So one of the courses that I teach is in the Mailman School of Public Health's core curriculum. The core is a sprawling, it's integrated and interdisciplinary core that brings together students across all six of departments of the school.

[00:06:10] It covers the foundational public health knowledge and competencies. So covering the biological, environmental, social determinants of health, health systems and health economics, and then skills-based courses including quantitative and qualitative analyses. And then the course that I teach, which is called program planning and evaluation.

[00:06:31] In the program and planning and evaluation class that I teach, we use a hybrid approach, or what other folks on the podcast might call a flipped classroom. So we have lectures that are online in chapters with some readings

and interactive module. And then our in-person time is used to cement what's covered in the videos through hands-on labs or discussion sessions.

[00:06:52] And the learning research has given us an opportunity to rigorously assess how students view their relationship with course materials and course content. So the research on teaching and learning that we're doing right now is using a human-centered approach. So we're exploring and how students approach the course materials, how they interact with them, and with the funding from SOLER, I've been working with my colleague, uh, Roxanne Russell in the digital learning studio to unpack students engagement with material. What do I mean with this? Well, since all of the materials are on the learning management system, what some folks call an LMS, we have a really rich data set on learning analytics that can help us quantify learning behavior, so we can examine whether and when students access readings or videos. [00:07:37] We can also even look at how much students have watched of a video, and we can also cross reference the learning analytics with learning outcomes. So yes, definitely grades, but also we can merge it with learning outcomes from course evaluations, such as perceived ability to integrate content and concepts across the core because it's such a complex class or whether students felt that the course promoted critical thinking.

[00:08:04] **Adam Brown:** Thanks, Sam and what have you discovered?

[00:08:07] **Samantha Garbers:** Some of what we've found with this work has been disappointing and confirms what other, who have been on the podcast have shared, which is that students don't always do the reading. Even when we break up the lectures into like short engaging chapters, they don't always watch the videos.

[00:08:22] Um, we've also found that there's a significant relationship between engaging with the course materials, such as readings and videos, and the grades on specific assessments that we've directly mapped onto these course materials. And opening this black box has really challenged my assumptions about learning behaviors that we assume to be essential.

[00:08:40] So a seminal text like this critical article might not get read. And going back to the framework that I talked about earlier of effectiveness versus efficacy, it's really helped me realize that what we care about is not efficacy, which is like, treating the syllabus as a protocol and emphasizing adherence to this protocol over everything else.

[00:09:02] The learning research is quantifying and qualifying what the gap is between the course as it's designed and how students experience and interact with it. And research using learning analytics is, is forcing us to confront the fact that pieces of our course that we perceive as like the active ingredient might not be the linchpin that we think it is.

[00:09:22] And so a course's effectiveness really takes into account the complex and dynamic environments in which a student exists. So their lived experience, the other courses that they're taking at the same time, or their motivations. And so this intervention research is helping us as educators explore, but also accept that there can be multiple pathways to learning within a course.

[00:09:48] As we explore engagement, what our research is focusing on is do students achieve learning outcomes if they're not engaging with specific elements of the course, and if the answer is no, then building interventions to promote more engagement.

[00:10:03] **Adam Brown:** So in the context of the science of learning, we're usually thinking about modeling our research on clinical research in which there's an intervention, and the research is based on measuring the impact of that intervention relative to some control group. So in the context of your research on teaching learning, what was the intervention?

[00:10:22] **Samantha Garbers:** Well, so one of the interventions we're researching are nudges. These are small changes in what's called the choice architecture or the environment in which people are making decisions.

[00:10:32] So these are factors that influence people to make a choice without a lot of cost to them. And these can include things like reminders or setting interim deadlines or setting individualized goals. And so with support from SOLER, we've done some intervention research testing, whether nudges worked in the public health intervention course in the core.

[00:10:54] So we ran a randomized control trial in which half of the students in the course received a nudge message explicitly linked engagement with course materials to grades and half didn't. So those who were in the Nudge Intervention Group saw a message that says, you know, do I need to do the reading? Well, the data show that students who did this reading scored X number of points higher on this assessment.

[00:11:18] And what we found was that the nudges didn't work universally. They worked in one week, but not in the other. And what we also found was that course engagement was higher in the weeks when the course met in person versus in fully asynchronous weeks. And our findings really comport with the published literature on nudges.

[00:11:37] Some nudges really work great, but some can have mixed effects, and they really depend on the behavioral barrier that the nudge is trying to operate on. So the takeaway is that understanding underlying behavioral mechanisms is crucial to making nudges work. So, we're now in a second phase of the research and we are using mixed methods, so quantitative and qualitative methods to explore students' motivations and learning behaviors.

[00:12:04] So the findings of this mixed methods work can help us unpack and describe and characterize the underlying behavioral mechanisms so that we can design and then rigorously test better nudges to increase engagement.
[00:12:18] **Catherine Ross:** Can I ask a quick question here, Sam, when you first discovered that the students weren't engaging with certain critical articles or materials that you had shared, did you survey them at all about why they thought they weren't engaging with them?

[00:12:34] I was just curious.

[00:12:36] **Samantha Garbers:** Yeah. Our second phase of research is actually engaging in pretty detailed interview with students. Not directly confronting them with the fact that assignments don't always, or course elements don't always get accessed, but really spending some time to delve, um, qualitatively into what students priorities are, what their motivations are, the sequence in which they interact with coursework, how they prioritize their work, and also even like what systems or tools or strategies they use, um, to organize their work in the core.

[00:13:06] **Catherine Ross:** What did you learn from that?

[00:13:08] **Samantha Garbers:** Well, we're still, we're still learning. What we're actually finding is that there are typologies of learners, so we're working right now to sort of identify personas. There's some people who are really motivated by learning. There are some people who are prioritizers, which is they will do work in orders that they perceive need to be addressed first.

[00:13:31] And there are other folks who are procrastinators who're actually still in the process of coding all of these data. But really recognizing, and this aligns with a pretty interesting 2018 systematic review by Dam Garden Nielsen, which is a systematic review of nudges in education, which really drives home the idea
that there's not a one size fits all nudge, and recognizing what motivates students can help them have a beneficial effect for all students. Once we're, we're nailing down the sort of typologies right now.

[00:14:02] **Catherine Ross:** That sounds like a lot of work for instructors, no?

[00:14:05] **Samantha Garbers:** It, it is, but this is, you know, this is the work that I find, uh, really interesting and really rewarding.

[00:14:11] You know, epidemiologists have a lot of skills and sort of merging that, I think what's great about solar is that merging those methods with, um, you know, education and teaching really can leverage the best of all the methods together.
[00:14:26] **Catherine Ross:** Right, right. So, Adam, I'm sorry, I jumped in. Did you wanna ask another question?

[00:14:33] **Adam Brown:** Yeah. So Sam, one idea that's come to mind as you've explained your project is the principle of backward design from the world of pedagogy, where we conceptualize that the way to design a course is by first identifying the learning objectives and then designing the syllabus as a way for students to achieve those learning objectives.

[00:14:54] To use an analogy, it could be like first identifying the summit that you want to reach and then creating a trail map for hikers to use to get there. So how does the research that you've done relate to this idea, but also maybe complicate the idea that we get from that trail map and model of the syllabus?

[00:15:15] **Samantha Garbers:** I mean, I think this gets into why it's so hard to integrate research, right? What we've learned from the evidence base into teaching, and it's, it's that it can be really hard to accept, and I'm guilty of this myself, right? That, that my course plan or my syllabus, or my learning plan or my vision for the course that I invested so much time in is not going to be what all the students experience, right?

[00:15:36] I think it, in my mind, sometimes they even say it out loud, but like, this reading's so great. And so this work is really sort of having us to confront that there is not one pathway through the course. That that syllabus, as I said at the start, that the syllabus is not the only trail through the course.

[00:15:52] And needing to acknowledge, accept, and build courses around sort of the different pathways that students build through a course. This work has actually required me to bring a lot more transparency to my teaching. So, Catherine, this gets a little bit to the question you asked early. It requires me to explicitly make the connection for my students, like why this text or why this framework, why this theory is relevant.

[00:16:20] And then it requires me to design opportunities to learn and to make this connection. And so asking students say, to apply it in an activity.

[00:16:32] **Adam Brown:** Yeah, I think, I think the two phases that you've been through with this research project reveal a broader principle, which is that in the science of learning world, we're often eager to jump right to the intervention stage to say, okay, I have this idea for a better way to teach this class. [00:16:46] I'm gonna implement and I'm gonna compare it to some alternatives, some more traditional alternative and and measure their learning outcomes or other student outcomes, comparing the two groups. But in fact, oftentimes we're not really ready to go to that stage because we simply don't know enough about the student experience at baseline.

[00:17:03] So it may be more important in some resort, it may be foundational. To adopt more of a sort of descriptive approach rather than an experimental approach. To try to just understand what students are actually doing, what they're experiencing, and from that, try to build an intervention that could enhance the student experience.

[00:17:21] And this may relate to that broader principle about the disconnect between research and teaching. The missing ingredient could be that really detailed description of what students are actually experiencing. Only then maybe can you translate research ideas into practice effectively.

[00:17:37] **Samantha Garbers:** Yeah, no, I definitely agree.

[00:17:39] Formative research is not necessarily the sexiest form of research

that happens in public health, but it's really critical, and particularly in the context of this class, which as I mentioned, it's very complex, it's large, it has a lot of interacting parts, and it has students with a lot of different, um, academic and work backgrounds.

[00:17:59] And so the formative research really is key to designing better interventions that we can then test. I agree for sure.

[00:18:07] **Catherine Ross:** I just wanna pick up on something you just said, which is about knowing who your students are. You mentioned the different backgrounds, both academic and work-based backgrounds. I imagine you've explored this, you know, how do you get to know your students in a way that is productive?

[00:18:25] Right? What are they bringing in with them when they first appear in your classroom? You know, what courses have they had previously that might relate to this? Or, or have they had none? Right? Or have they been in school straight through? Or are they just coming back to school for something? So I think some of our other podcast guests have mentioned that as being a powerful driver of student motivation.
[00:18:52] You know, being aware of those factors allows you, the instructor, right, to better tune what you're doing to all of the prior knowledge and prior experiences into account.

[00:19:05] **Samantha Garbers:** Absolutely. And there is actually a sort of broader trend in education, which is the growth of sort of astronomical growth of undergraduate public health degrees, which is not something that existed at this scale when I first started teaching.

[00:19:20] So that we do have students whose backgrounds have shifted over the last decade. So less applied work experience, but more training in sort of the knowledge of public health, which is actually very fun for my teaching. But because my class is particularly around applying to real life situations, there's a lot of parallelism between my experience and the students experiences, which is, the work that we have to do has to acknowledge the context of where these interventions are happening, and at the same time, the teaching has to acknowledge the sort of shifting context that students are bringing in from their prior work. Absolutely.

[00:19:59] **Catherine Ross:** That's really interesting. Well, thank you, Sam,

for this wonderful tour of how the research can work and how humans may still struggle with changing the behaviors and you know what we do.

[00:20:14] My final and favorite question is to ask what keeps you motivated to engage in this deep researching of your teaching and seeing your teaching as a project for continual improvement?

[00:20:28] **Samantha Garbers:** Yeah. I think the most important part is that I'm recognizing that I'm always learning just as my students are and when I apply what I've learned about teaching or what I've, when I apply what I've learned about evidence-based, better ways of teaching, it really makes a difference for my students, and not just in their time at Mailman, but in their career.

[00:20:48] So when a student reaches out, like after graduation, after they're spending some time in the field to say, I'm using this technique or this framework, given article has really given me, has helped me at work. That's what keeps me going and it does happen, which is the best part.

[00:21:03] **Catherine Ross:** That's wonderful. Yes.
[00:21:05] That's great. Well, thank you Adam for co-hosting and, and thank you Sam for being such a gracious guest. We are very grateful for your participation in our sixth season of Dead Ideas.

[00:21:19] **Samantha Garbers:** Great. Well, it's an honor to be here. I really enjoy the podcast and I consider myself lucky to be among such a bright team, so thank you.

[00:21:27] **Adam Brown:** I agree. Thanks very much. It was my pleasure.

[00:21:33] **Catherine Ross:** If you've enjoyed this podcast, please visit our website or you can find any resources mentioned in the episode, ctl.columbia.edu/podcast. Please like us, rate us and review us on Apple Podcast or wherever you get your podcasts. Dead Ideas is produced by Stephanie Ogden, Laura Nicholas, John Hanford, and Michael Brown.

[00:21:56] Our theme music is *In The Lab* by Immersive Music.