



## Leading Learning Podcast Episode 273

Megan Sumeracki (00:00):

They engaged in X amount of time of some specific learning strategy. So it didn't matter whether they were interested or not in terms of actual learning because they all engaged in retrieval practice at a certain level. So it's actually kind of good news. You don't have to be overly interested. As long as you know that you have to learn the content, even if you're not interested in it, if you can buckle down and use the science of learning to say, "Here's the strategy that's going to be effective," it will be effective.

Jeff Cobb (00:30):

I'm Jeff Cobb.

Celisa Steele (00:31):

I'm Celisa Steele, and this is the Leading Learning Podcast. Welcome to episode 273 of the Leading Learning Podcast. The second episode in our series on learning science's role in a learning business features a conversation with Dr. Megan Sumeracki and focuses on cognitive psychology, one of the bedrocks of the science of learning.

Celisa Steele (00:58):

Megan Sumeracki holds a PhD in cognitive psychology from Purdue University and is currently an associate professor of psychology at Rhode Island College. Her area of expertise is in human learning and memory and in applying the science of learning in different contexts. In 2016, she co-founded The Learning Scientists, a group of cognitive psychological scientists aiming to make scientific research on learning more accessible to students, teachers, and other educators, and their blog and content are great resources for those interested in learning science.

Celisa Steele (01:34):

Megan is committed to bi-directional communication between those doing research on learning and those applying the research. She works to foster conversation and exchange between researchers and practitioners with the goal of making the science of learning more accessible. Jeff spoke with Megan in May 2021.

Jeff Cobb (02:00):

So what's one aspect or tenet of effective learning—and this would, obviously, talking to you, be one that's supported by good research and science—what's one aspect or tenet that you wish was more broadly understood and supported by those who are designing and providing learning, particularly to adults, which would be pretty much our audience?

Megan Sumeracki (02:23):

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available at [www.leadinglearning.com/episode273](http://www.leadinglearning.com/episode273).*

So it's an unfortunate point, but it's one that I think that everyone really needs to know and needs to embrace is this idea that when we are in the moment learning, and we are making our own judgments of how well we're learning—so making assessments, “Am I understanding this? Am I going to remember it in the future?”—we're actually really bad at putting ourselves in the future context and actually realizing how well we'll do in that context.

Megan Sumeracki (02:54):

So I can give an example that will make this a little bit more concrete. When we are repeatedly reading, let's say, we have a portion of a textbook, or it might be some sort of manual or just really any written content that has been given to us and we're trying to learn from that content, while we are reading, the process of repeated reading makes the content very familiar, and reading over something again and again starts to make it such that our processing feels very fluent.

Megan Sumeracki (03:26):

This tends to trick us into thinking that we are learning it really well and makes us think that, in the future, we're certainly going to remember it. In my lab, we can give students a passage, let's say it's on sea otters, and have them read it over and over and over again, and, by the end of it, they think that they know everything there is to know about sea otters, and they'll never forget anything about sea otters.

Megan Sumeracki (03:48):

They're sick of it; they feel done. But that repeated reading actually doesn't tend to lead to long-term, durable learning. On the other hand, putting the content away and trying to produce it from our own memory, which is called retrieval practice, doing that actually does produce pretty long-term, durable learning. But it feels very difficult, and that difficulty tricks us into making us think that we're not learning it as well.

Megan Sumeracki (04:16):

So we often see this unfortunate situation where the strategy that makes us feel like we're learning well might be working fine in the very immediate moment but is not going to produce long-term, durable learning whereas the thing that feels more difficult and actually makes us think we're not learning as well is the thing that actually is producing the long-term, durable learning. So this just means we need the science even more because our own assessment of how we're doing in the moment, just it's lying to us to some extent.

Jeff Cobb (04:53):

There are so many directions I'd like to go with that. I know, personally, in my own life, I've recognized more and more—it's been a very hard lesson for me to learn—that, yes, retrieval is required. You have to make that effort. The reason I came to it is I'm continually listening to things and reading things, and I'm shocked when I go back later, and I will reread something that I read years ago thinking that I got something from it, and I don't remember a word of it.

Jeff Cobb (05:17):

It's like I'm reading it for the first time because I never really made any effort to truly incorporate it into my long-term memory. Then, on a somewhat related note, and this would speak to what many members of our audience deal with is when presenters, facilitators, speakers, educators are, say running a conference session, offering a seminar or whatever, you

get those inevitable evaluations afterwards, which are often referred to as smile sheets, because you want to know, more than anything, did they enjoy it.

Jeff Cobb (05:47):

Did the learners enjoy it? But often, that's not a good signal of whether they actually learned anything or not because maybe the effort wasn't there. When you think about organizations that are in the learning business—so they're trying to help people learn, that's part of their mission basically; it's also how they generate revenue—what advice would you have for them about how to make good use of learning science in their offerings? How can they be sure that they're actually being effective in providing these learning experiences for the people they serve?

Megan Sumeracki (06:19):

So you mentioned those sheets at the end. You want to make sure that the participants enjoy the experience, and enjoyment doesn't necessarily mean learning, but there is a difference between—I hate to say it this way—but there's a difference between having students captive and having individuals who are choosing to be a part of the learning experience. I think when we are in that position where the participants are choosing to be there, if they don't find it enjoyable, then they're not going to come back, and that might mean that they're not going to learn as much.

Megan Sumeracki (06:55):

So in some situations, enjoyment maybe is essential for learning. I do think that it's important, even when we have a captive audience to try to make sure that they're enjoying it, but we want to make sure that we're not misunderstanding enjoyment and learning because the thing that is often enjoyable is the thing that feels easy and feels like we're learning.

Megan Sumeracki (07:15):

That doesn't mean that people don't like being challenged, but when you feel like you're being challenged, and you feel like it's not causing learning, then that really stinks. So, essentially, I think the thing that is going to be really helpful in the context that you're talking about, where we have people who are choosing to be there, is to make it enjoyable but then also to infuse the science of learning within and, to the extent that you can, have the participants engage in retrieval practice.

Megan Sumeracki (07:45):

Just bringing information to mind in some way could be really helpful, and retrieval practice does not have to be just giving a quiz or a test. We sometimes talk about it that way because in some educational contexts, that's a really easy way to implement retrieval practice and gets the learners ready for assessments that they're going to have to do in the future, but it can also just be chatting about the content or asking the participants to bring to mind something and then maybe have a few people share out.

Megan Sumeracki (08:16):

That might be thought of as covert retrieval, which can work. You just have to make sure that people actually think of the information, which is tough to do. To the extent that you can engage your participants in retrieval practice, it can be really helpful and really powerful. Another one that is particularly powerful is this idea of spacing out learning over time, and that's a tricky one when we're talking about these professional development sessions that tend

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to be very condensed, say over a weekend or an in-service day or those types of things, but any way that you can sort of spread the information out over time will be helpful.

Megan Sumeracki (08:57):

Perhaps that means maybe giving people a bit of pre-conference reading, which may be a hard sell but that could be done to produce spacing, or to maybe create some system where afterwards there's a text message that is sent to remind the individuals to engage in retrieval practice, or some sort of post-conference reminder sheet or something that spreads it out a little bit more over time, can be really helpful in terms of producing durable, long-term learning.

Megan Sumeracki (09:29):

It doesn't have to mean that you spend a month physically with the people and then just space the sessions out. We've learned over the last little bit here that we're actually pretty good at meeting virtually even if we don't like it as much as perhaps getting together in-person. So spacing and retrieval practice, I think, are the most important things, and they're probably relatively easy to implement. You'll just have to think a little bit outside the box in terms of timing.

Celisa Steele (09:59):

If you're looking for a partner to help you implement spacing and retrieval practice, check out our sponsor for this series. SelfStudy is a learning optimization technology company. Grounded in effective learning science and fueled by artificial intelligence and natural language processing, the SelfStudy platform delivers personalized content to anyone who needs to learn either on the go or at their desk. Each user is at the center of their own unique experience, focusing on what they need to learn next.

Celisa Steele (10:30):

For organizations, SelfStudy is a complete enterprise solution offering tools to instantly auto-create highly, personalized adaptive learning programs, the ability to fully integrate with your existing LMS or CMS, and the analytics you need to see your members, users, and content in new ways with deeper insights. SelfStudy is your partner for longitudinal assessment, continuing education, professional development, and certification. Learn more and request a demo to see SelfStudy auto-create questions based on your content at [selfstudy.com](https://selfstudy.com).

Jeff Cobb (11:12):

How would you describe where we are with learning science right now? It seems to me that even in the past decade, definitely in the past two decades, we've just made leaps and bounds in really understanding how people learn effectively, or at least that's my perception. But what's your perspective? How well do learning scientists and people who really know learning, how well do we truly understand how adults learn at this point?

Megan Sumeracki (11:35):

I think that's a tricky question because, on the one hand, I think we understand it pretty well. You're right, in the last couple of decades, we have made leaps and bounds, and some of these strategies, the two that I've been talking about, have been around as long as the field has been around. So the spacing effect was originally studied by Ebbinghaus in the late 1800s. This isn't new.

Megan Sumeracki (12:00):

Perhaps the way that we are disseminating information and trying to have conversations with those who are in the business of learning is new. So there's more conversation there, which, of course, means that we can talk about these effects, and I think that's really important, and science has done—at least my field has done—a poor job in the past of communicating the science effectively and in a way that is...sometimes you'll have people say, "Here's what you should do," and that doesn't really go across very well.

Megan Sumeracki (12:30):

Frankly, we don't understand every context that people are trying to learn in—there's no way to do that. So it should be a conversation. But, in retrieval practice, the first paper that I know was published in 1909. So these are not new things, but I think we've learned a lot about their durability and the ways that we can implement them.

Megan Sumeracki (12:51):

Then there are other areas where we maybe don't know as much, and there are still many open questions. I think a good scientist is going to acknowledge that and is not going to try to create a one-size-fits-all prescription and say, "Always do X, Y, and Z, and you'll learn, the end," but is going to be a little bit more open to flexible guiding principles and working with the groups to try to figure out what's going to work best in their context and understand that it's actually quite difficult for us to predict exactly how a specific adult is going to learn specific content because there are so many variables at play.

Megan Sumeracki (13:31):

We have general rules of thumb, and those rules of thumb tend to work pretty well across the board. We continue to investigate other features of learning like motivation, various learning disabilities that might come into play, or just differences in knowledge base, and so on. There's still a lot for us to learn, but I think we are on solid footing to make recommendations.

Jeff Cobb (13:57):

Well, it's interesting you draw that contrast between what learning scientists know and have known for quite some time and what's more broadly known because I myself have witnessed being in a session where somebody puts the Ebbinghaus forgetting curve up on the screen and talks through it, and it's a revelation to many of the people in the room, and, like you said, that was the late 1800s that that first came out. So what's your perspective on how broadly dispersed the knowledge about learning is? Have you seen the reach of that knowledge expand significantly, at least during the time that you've been working as a learning scientist? Is it getting some traction now?

Megan Sumeracki (14:35):

I think so. So the reason my colleague Yana Weinstein-Jones and I created The Learning Scientists (and she's not really involved anymore; she left academia), but the reason we created it originally is because we were just really disappointed, I guess, in the avenues that we typically use to disseminate our research. So, for example, I might write a peer review research article, which is important; it's essential for my job.

Megan Sumeracki (15:04):

I might write one of those articles and then, at the end, talk about the ways that this research would be applicable in educational settings. Then I realize no one is reading this article. Even myself, as a professor at an institution, might struggle to gain access through the library system to that specific article because our library doesn't have that particular volume or whatever.

Megan Sumeracki (15:31):

If I'm having trouble gaining access to some of these things, and I am struggling to find that time to do everything it is that I need to do and read everything that I'm supposed to read, it's unreasonable to expect those who are in these real, boots-on-the-ground learning contexts to gain access to these things, read it, and figure out how it applies in their settings.

Megan Sumeracki (15:56):

Honestly, reading these journal articles—I'm in the field, and I'm interested in it—and sometimes it's a bit of a slog. It's very important that we have very technical information in there and that we are extremely specific and give, frankly, more information and detail than anyone would expect. That's actually really important so that we can peer review and make sure things are replicable, et cetera, but reading through that, as someone outside of the field, I just can't even imagine it.

Megan Sumeracki (16:24):

So, if that was our main focus—and then sometimes we might write op ed pieces or what have you—then, of course, we're not reaching as many people. It's not accessible. So The Learning Scientists project really was about trying to make learning more accessible and the science of learning more accessible.

Megan Sumeracki (16:41):

We originally wanted to connect with students, mainly high school students who just wanted to learn how to study better, but we found that the students were maybe not so interested or not as interested in what we had to say until it was the night before an exam, and, at that point, telling them not to cram, it's sort of too late.

Megan Sumeracki (16:59):

We found that teachers and other individuals who were engaging in these educational contexts were really interested in what we had to say. So it could just be my own perception, but I feel like this Learning Scientists project and trying to disseminate the information in the way we do, in a more accessible way, has had an impact. We're certainly not the first ones to try to do this, and I'm sure we won't be the last, but I think that that type of communication has become a lot more common, and that's really a great thing.

Jeff Cobb (17:39):

A lot of what you've been talking about is grounded in the field of cognitive psychology. So could you tell us a little bit more about what the field of cognitive psychology is? That's a big question, but, in general, where do you focus? Then I'd also really welcome how you distinguish between that and behavioral psychology because they both seem to have such a role to play in how we think about learning.

Megan Sumeracki (18:02):

So it's interesting. If you were to ask one of my advisors—my master's advisor, we call him Roddy, Henry Roediger, from Washington University in St. Louis—he would say that behaviorism is alive and well, and that cognitive psychology, we're all just behaviorists at heart. From that perspective, because of that training, I do think that they're pretty related. Historically, behaviorism was—this is a simplified version, and I'm not an absolute expert in the history of the field of psychological science—but behaviorism was a reaction to these disciplines, the early schools of thought where there was a lot of introspection and just thinking about thinking and not a lot of observable behavior.

Megan Sumeracki (18:49):

The behaviorists really wanted us to be taken more seriously as a science and said, "You really don't know what you're asking. A lot of people are not aware of the ways that their mind is working, and there are unlimited questions that you can ask. So we really need to be taken more seriously. We need to study what we can see and what we can verify in observable behavior."

Megan Sumeracki (19:11):

They also tend to have this idea of being born as a blank slate and that it's really all nurture as opposed to nature, but behaviorists really focused on studying behavior, and they felt like...they didn't deny that mental processes were going on, but they thought we didn't need to deal with them, that we could just sort of leave them in the black box. We don't need to study them. We can understand everything by looking at behavior.

Megan Sumeracki (19:38):

Cognitive psychology, I see it as kind of swinging the pendulum back towards the middle and saying, "Look, we really do need to focus on mental processes. We can't ignore the things that are going on in our minds, but we also should be studying observable behavior and trying to produce situations where we can verify."

Megan Sumeracki (20:01):

So cognitive psychology is all about studying the mind and our own mental processes, but we often, almost always are looking at observable behavior as a way to get at what's going on in our minds. So cognitive psychologists study things like our perceptual systems. So how do we see and then recognize a chair as a chair, and how is it that when we see a new chair that we've never seen before, we don't have trouble identifying that that thing is a chair and placing it in that category.

Megan Sumeracki (20:39):

We might study memory and learning. We might study problem solving and understanding knowledge representations. There's a ton there. So that's really what cognitive psychology is all about, and, when we are trying to apply cognitive psychology to educational settings, a lot of us use—together, it's not just one person engaging in this model but collectively—we engage in this lab-to-classroom model, where we start out with very basic research, where we're using extremely simple stimuli, the things that we're trying to get the people to learn.

Megan Sumeracki (21:17):

Ebbinghaus used nonsense syllables, for example; that's not something you would really want someone to learn, but the reason for using nonsense syllables is you can control it, and you can make sure that they don't already know these nonsense syllables or lists of words or even

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foreign language vocabulary, where we can be pretty sure that the individual doesn't know those terms already. We use a lot of Swahili because very few people know Swahili although there is now an army of undergraduates who have learned Swahili-English word pairs.

Megan Sumeracki (21:49):

We use those to try to control the experiment as much as possible, and, with that control, we are able to determine cause-and-effect relationships. Then we can say this thing is actually causing learning, and it's very difficult to do that if we were to jump into the classroom or a real learning context right away because we would lose some control.

Megan Sumeracki (22:09):

From there, we don't want to just say, "Great. That helps people learn nonsense syllables. That means it works in all situations. The end." We then do need to start introducing materials that are more similar to the types of materials that an individual might actually learn. We may still do that in the lab to try to maintain control, but we're getting closer to the real environment. Then we finally then go into that actual environment and start looking to see whether or not these processes that we have that people engaging in, if it's actually causing learning.

Megan Sumeracki (22:43):

We can do that in classroom settings, but there are also examples of doing this in professional development settings. I work with a colleague, Thomas Van Hoof, I work with him to write along with Christopher Madan, who's a neuroscientist in England, to write papers about the science of learning applied to continuing professional development in medical education. In that way, we can go into those live continuing education settings and look to see how they've implemented learning strategies and whether that's worked. Do residents then perform better in their hospitals? And so on. We've done some review papers there.

Jeff Cobb (23:21):

As I was listening, I hadn't really made this connection before, and maybe it's overly simplistic, but it feels to me like memory is the connecting point between cognition and behavior. Ultimately, it's got to be in memory, at least the way I view it, ultimately, it's got to be in memory for you to have learned it. If it's not there someplace, then maybe you haven't learned it. I may be wrong in saying that. I'd love your perspective. How do you describe memory's relationship to learning and memory's role in learning?

Megan Sumeracki (23:51):

Gosh, that is such a tough question. I do sometimes when I teach my learning course—because, of course, learning courses are sometimes taught in the behaviorist tradition of just animal learning and operant conditioning, classical conditioning—I tend to teach it with a little bit of that but also some of the cognitive pieces sprinkled in, where we focus on memory and some more human learning type situations.

Megan Sumeracki (24:18):

I often will ask them, "What's the difference between learning and memory?" At the very beginning of the course, they'll confidently tell me that learning is the process of getting the memory. So learning is how you're getting it into your head, and then, once it's in your head, it's a memory, the end, and I'm not so sure that that's the case.



Megan Sumeracki (24:35):

I'm not sure I know the answer to my own question because we often talk in these spatial metaphors. So we're trying to get things into our head, or, if we can't remember something, we're trying to find a memory, and we might search for it. We have all these spatial metaphors, but, at the end of the day, there's got to be some remnant of the past, but that doesn't mean it has a specific location.

Megan Sumeracki (24:59):

It doesn't live in a specific cell, and we can't point to a part of the brain and say that's where everything is. Rather, it's networks and systems neurologically. So you can also show evidence of learning without realizing it. Even amnesic patients, if you don't ask them to specifically think back, will show evidence of having learned something, even if they can't consciously remember it.

Megan Sumeracki (25:25):

So I think it's a lot more complicated than we think, but I guess I sort of agree with my students, where learning is this process of acquiring the information to some extent, and we have to be able to use it in the future, but whether or not we can use it in the future and how much we're actually able to produce consciously is only part of the story.

Jeff Cobb (25:45):

I'm wondering if related to that, you already brought up retrieval and retrieval practice earlier as a technique that learning businesses can certainly help support more. Retrieval, of course, seems so essential to memory, and it's kind of funny because in order to have retrieval practice, in order to do retrieval practice, you have to have something in memory to retrieve in the first place, but then you're retrieving it in order to cement it and really get it there for the long term.

Jeff Cobb (26:13):

Could you maybe give us a tutorial in retrieval practice? What it is? And maybe some more examples of it because I think that is a very rich area for our audience to do more with.

Megan Sumeracki (26:23):

Interestingly, you can actually try to retrieve and fail. There's some research suggesting that that failure of retrieval does help you learn, whether that be because it potentiates the next learning opportunity (that's probably what it is), but you can try to retrieve and fail. Obviously, at some point, you're going to have to produce the information, but you don't have to necessarily produce all of it.

Megan Sumeracki (26:47):

It's a pretty powerful way to learn, but, essentially, retrieval practice is just bringing the information to mind. You technically don't have to overtly produce it in order to bring it to mind. You can just consciously bring it to your mind, and I have some research suggesting that covert retrieval—just bringing it to mind without producing it—might be just as effective as overt retrieval, but that's with very simple materials.

Megan Sumeracki (27:13):

Research with more complex materials, like what you would learn in an actual context, does suggest that it's difficult for us to just mentally articulate everything that we need to articulate

to retrieve, and, in that way, producing it by either writing it, drawing it, saying it is helpful. So really, that's all it is, though, is bringing it to mind and then hopefully producing it in some way.

Megan Sumeracki (27:38):

I'm retrieving information right now. I'm thinking about how would I go through this if I had slides with me and make sure that I cover everything, and I'm producing the information for you from memory without looking at it or reading it. Although cues could help you retrieve as well. Retrieval helps us learn in a few different ways, and, thankfully, from a practical perspective, it doesn't really matter what the reason is, to some extent.

Megan Sumeracki (28:05):

They all sort of pile on together. It's not like you have to pick one way that retrieval is beneficial or another way. They all work together, but we can separate different ways. One way that is a little bit more intuitive is this idea that retrieval indirectly produces learning through something else. So retrieval produces feedback about what you know and what you don't know, and that feedback might allow you to then learn.

Megan Sumeracki (28:32):

It can allow you to study more effectively and efficiently. You can allocate resources. You can review things that maybe you wouldn't have reviewed had you not realized you couldn't remember it. All of those things can produce learning. It can also give an instructor knowledge about what the individuals who are trying to learn actually know and that can allow them to engage in more targeted instruction, whatever that might look like.

Megan Sumeracki (29:00):

In addition to all of those indirect effects, which are really useful and helpful, there is a direct effect, where something about bringing the information to mind is producing learning, in and of itself. There are a lot of theories about how this might be working. The real answer is probably some combination of these theories, but, at the end of the day, it's really neat that there's this direct effect.

Megan Sumeracki (29:24):

So, like I said, you don't have to pick it. As a professional development educator, you wouldn't have to say, "Today we're going to learn directly with retrieval practice, and tomorrow we'll do indirect." It doesn't have to be that way. It can all just pile on to make it really, really helpful and beneficial. So one way in educational settings to engage in retrieval practice is to give frequent low-stakes tests or quizzes.

Megan Sumeracki (29:49):

The low stakes helps with test anxiety and makes it so that you don't have to be perfectly successful. You can just do this very, very frequently and practice retrieval, but it doesn't have to look that way. It could be just drawing what you can remember or maybe sketching out a concept map, explaining it to one another, so when people are in small groups, if they're explaining without the aid of the material right in front of them, that produces retrieval, and all of those things can be really, really helpful.

Jeff Cobb (30:28):

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It's increasingly common for there to be recorded presentations of material—so stuff that used to happen in a classroom has now gone into a virtual conference. A lot of those virtual conferences are now getting sessions pre-recorded because it's very convenient for the event producers to be able to know they've got it in the can, and they can play it, but if you're a presenter—and I'm in this position often myself—you don't have any live interaction with the people you're teaching. You're just talking.

Jeff Cobb (30:52):

So we're trying to think of ways that we can get people to participate primarily for purposes of retrieval, even in those types of presentations. So we've done things like we'll pose a reflection question and give a little bit of a pause time or even ask them to respond in the chat, if we know there's going to be a chat there, even if the presentation itself is not live—so in some way to engage with the material. Do you see those as viable ways to support retrieval in those record environments, and what might some other possibilities be?

Megan Sumeracki (31:25):

I do. Yeah. So I run into this with my own courses. I am now teaching primarily online, and I think it can be very effective. What I've chosen to do is a blend of asynchronous and synchronous content. So what you described sounds like it would be totally a synchronous. Well, actually, what you described is different. It's almost like the presenter is asynchronous and creating it ahead of time, but then the participants are live all together.

Jeff Cobb (31:59):

Yeah, that's very common now in the virtual event world.

Megan Sumeracki (31:59):

When I say "asynchronous," I mean that students or the learners can be doing the material, engaging with the video whenever, whereas synchronous would be that we're all together talking about it. So it sounds like you have a little bit of both. When I'm preparing the asynchronous videos for my students, so putting up a lecture video and letting them engage with that on their own time, and then we'll come together to talk in the classroom, I do often say, "Pause this video and think about X."

Megan Sumeracki (32:25):

We talk about retrieval and the importance of it, and then, to motivate them to actually do it, I will say, "And bring those responses to our next synchronous class," or something like that so that there's a reason for them to actually do it because otherwise they might just say, "I'm not going to pause. I'm not going to write it down. I'll just think about it in my head for a second." And that's where covert retrieval doesn't work as well.

Megan Sumeracki (32:49):

If they really should be writing out a description of something, and they just say, "I kind of got it; it's in my head," they're not fully retrieving it. They're just thinking about the main idea and saying, "Yep, I'm good," and that's not the same as fully articulating it. So I think what you mentioned of saying, "Please type it into the chat," where everybody then is doing it, and they're being held accountable to some extent or at least there's some motivation to actually engage in the retrieval is really important because otherwise I think it gets skipped.

Megan Sumeracki (33:22):

So it's not that retrieval doesn't work but, while we're trying to implement retrieval, we're not effective at actually getting people to retrieve well. Then, of course, retrieval practice isn't going to help. So, yeah, I think having responses, whether it be in the chat or sending out text messages later on with reminders to practice retrieval—I've seen that in some of the continuing professional development among medical or health educators—that can work really well, and it also produces some spacing.

Megan Sumeracki (33:52):

I think, to the extent that breakout rooms can be used, giving the individuals prompting questions and having them talk through them in breakout rooms can be helpful. Collaborative retrieval is tricky because sometimes, when individuals are all trying to retrieve together, everyone has their own retrieval structure that they're going to use, and each individual is not going to have the same one. So, if one person starts to retrieve information that the other person wouldn't have necessarily started, it can sort of disrupt.

Megan Sumeracki (34:22):

So having them retrieve on their own first for a little bit and then coming together for a group is probably the best way that I can say to engage in collaborative retrieval although that is an area where we need to know more, an area where cognitive science still has a lot of room to grow. But those types of things can be helpful. It doesn't have to be really fancy. It really could just be pausing and saying, "What would you say the answer to this is?" Or I, in my videos, implement...I can put in little quiz questions where the students stop and then have to answer, and it tells them if they got it right or wrong, and that's just something that they have to do to stay engaged and maintain attention.

Megan Sumeracki (35:03):

The other nice thing about these retrieval practice opportunities is that they break it up a little bit and help the participant maintain attention and stay focused. It gives them a little bit of a break because it's difficult to attend to something for a very long time if it keeps going on and on.

Jeff Cobb (35:22):

It sounded like maybe feedback is beneficial for retrieval, but that there's an element of retrieval that's effective, even without feedback, per se. Maybe if I can give an example of how I would think about this, to see if I'm on the right track or not. For example, I'm a musician. So I'll practice a musical piece and, if I have a musical piece or even just scales or something in mind, and I sit down at the piano, and I say, "Okay, I'm going to do these. I'm going to play my C scale," let's say, and I know in my mind how to do that, then I go to actually play the C scale, I'm going to be getting feedback because I'm going to hear how it sounds.

Jeff Cobb (36:03):

If I hit a wrong note, then that's some feedback that's telling me I need to go back and practice that again. Of course, that's just me independently in the learning experience producing my own feedback. Obviously, I could also be getting feedback from an instructor if I'm doing lessons or that sort of thing.

Jeff Cobb (36:19):

Before I actually get to the point of playing at the piano, is there something happening in terms of retrieval that's contributing to learning, even before I actually get any sort of feedback from the instrument?

Megan Sumeracki (36:30):

Musical instrument learning is tricky because I'm thinking about this and trying to decide if there are situations in learning content where you do get immediate feedback like that and you know if it's right or wrong. I guess, as a musician, you can tell if something is what you intended it to be, but you could have a musician who's playing a scale and is oblivious that a particular note is wrong, and they wouldn't know, and someone would need to step in and say, "That was incorrect. Here's what you need to do," and I feel like that's kind of the situation that we're in when we're learning content.

Megan Sumeracki (37:10):

I'm saying all of these things to you, and I guess I could be...I'm getting feedback that you're understanding, as you're nodding along with me, but, really, another expert would have to listen to what I'm saying and then tell me, "Yes, you're right," or, "No, you're wrong," and I think I'm right, and I'm pretty sure that I am, but, of course, I'm never going to insist that I couldn't possibly be wrong.

Megan Sumeracki (37:34):

I don't know if there's something going on even beforehand. I suppose when you produce the information, you have a certain level of confidence, and that confidence could drive how well you think that you're doing. You can think that you're doing really well, or you could think that you're not, but that level of confidence does not necessarily mean perfect accuracy. One question that we use a lot in cognitive research to demonstrate confidently wrong—

Megan Sumeracki (38:05):

we can produce a situation where someone is confidently wrong—is asking Americans about the capital of Australia, and a lot of Americans, we find, will confidently say Sydney. Maybe I've seen Melbourne, but, of course, the capital of Australia is Canberra, which I wouldn't have known except for this question. In January of 2020, I visited Australia and did some work with a Brisbane School, which is where I learned that it's pronounced Canberra [CAN-brah] and not Canberra [can-BEAR-a].

Megan Sumeracki (38:36):

I made a fool of myself and got some corrective feedback from the individuals at the session because I said Canberra, and they all laughed at me, sort of, but quietly, and I knew immediately I'd done something wrong. So I suppose, in that case, you are getting feedback, but just because you are confident doesn't necessarily mean you're accurate. So the feedback is not essential. There is a direct effect of learning. Practicing retrieval helps even when you don't get the corrective feedback.

Megan Sumeracki (39:07):

However, adding the corrective feedback in can make it particularly effective, and, if you consistently retrieve the wrong thing, you can strengthen the wrong thing. If I said, "Sydney is the capital of Australia," and no one corrected me, and I said that repeatedly over time, then I might become even more confident that I'm correct that Sydney's the capital, when in reality, I was totally wrong and maybe had never even heard of Canberra before.

*This transcript accompanies the episode of the Leading Learning Podcast available at [www.leadinglearning.com/episode273](http://www.leadinglearning.com/episode273).*

Jeff Cobb (39:44):

So, to wrap up our conversation, learning science is something that's evolving all the time, an incredibly interesting field. I'd love to know what interests you at this point in what we don't know about learning science, about how learning happens. Are there questions that you would just really love to see answered?

Megan Sumeracki (40:06):

I am extremely interested in motivation, and just over the last year, year and a half with the pandemic teaching—I'm dating the episode a little bit (I know I mentioned it before too)—but all of this COVID-19 pandemic teaching that we've been doing, I'm interested in this idea of motivation and even interest, intrinsic and extrinsic interest, and I actually do think that the field knows a fair amount about that. I just don't know quite as much about that.

Megan Sumeracki (40:36):

So that's something that I'm wanting to dig into, but anything along those lines or just individual differences and how that can shape the way an individual learns in specific contexts. There are some individual differences that likely matter, like prior knowledge in an area or skill in a specific area, reading comprehension skill; there are also some individual differences that we've learned don't matter.

Megan Sumeracki (41:02):

So this idea of learning styles is popular among a number of individuals. It's an extremely pervasive myth that matching instruction to an individual's learning style is going to help them learn, and we find that that's just not true. Individuals do have preferences. You might prefer to listen to a podcast or watch a video over reading something. You might prefer online versus in-person, or you might prefer in-person versus online, but that doesn't necessarily mean that that's the way that you're going to learn.

Megan Sumeracki (41:35):

What matters is the processes that you are engaging with, and certain materials tend to be better. So imagine trying to learn to play a musical instrument by reading a book and never picking it up. Or imagine trying...if you had a surgeon who said, "Well, I've never actually done it because I'm a visual learner, so I've just looked at diagrams of people doing it. But don't worry. I'm good to go because that's my learning style." That doesn't make any sense.

Megan Sumeracki (42:00):

It would be very hard to learn anatomy without diagrams and so on. So those individual differences don't seem to matter in terms of learning. I do think that anybody can learn online or in person. We just have to make sure that the processes that they are engaging in online or in person are top-notch, and I think some of the difficulty over the last year isn't so much the online learning as it is the online learning while we're being forced to online learn and being forced to do a lot of crazy things during this pandemic and the stress and being cooped up in the house and having too many people in one space, not having the quiet space that you need. But I'm just really interested in those individual differences and how they sort of affect how we learn.

Megan Sumeracki (42:45):

I think we know some things, but there's certainly more to learn. Cognitive psychologists who are experimentalists don't tend to look at individual differences as often as some other areas of psychology, but I think we're to the point where we should be doing that more.

Jeff Cobb (43:00):

I have to ask a follow-up question on this one because motivation is an area that I'm particularly interested in, and we've been interested in. I'll again take it back to this context in which our work occurs, which is with what we described as learning businesses—people who are offering learning experiences out to an audience—and if you just take your typical conference session or seminar, the people who show up for that are going to have widely varying levels of motivation.

Jeff Cobb (43:28):

So I'm wondering—and you may not be far enough along to have formed any perspective on this—but in terms of helping to foster motivation, or maybe it's manage motivation, within those adult learning settings, trying to get everybody a little bit more motivated to learn, are there any tips or tricks that you might know at this point to suggest?

Megan Sumeracki (43:53):

So it's interesting. We've been talking throughout—I've never said the term—but we've been talking about metacognition, which is this idea of do I know what I know and can I just determine how well I'm learning in this context is one example. It turns out there is some research that I know of that came out of my lab from my PhD program—they're still doing this work; I don't think it's published yet—but looking at interest and how interest affects learning and also how interest affects your metacognitive judgments of how well you're learning. And what they found was that having a greater interest in the material (self-reported interest in the material) led to increased judgments of learning—so they thought that they were learning it better—but it didn't actually affect actual learning because they were captive.

Megan Sumeracki (44:47):

We talked about this at the very beginning. They engaged in X amount of time of some specific learning strategy. So it didn't matter whether they were interested or not in terms of actual learning because they all engaged in retrieval practice at a certain level. So it's actually kind of good news. You don't have to be overly interested. As long as you know that you have to learn the content, even if you're not interested in it, if you can buckle down and use the science of learning to say, "Here's the strategy that's going to be effective," it will be effective.

Megan Sumeracki (45:17):

Now, of course, that takes a different level of motivation, a different type of motivation, and I don't know how to produce that yet. Maybe someone in the field does, but that's not something that I know about. But the good news is you don't have to love every minute of it in order to learn. But if our audience isn't captive and they have a choice, how do we increase interest or increase motivation?

Megan Sumeracki (45:42):

Honestly, I'm not sure. I know what would motivate me. So knowing that the processes that we are going to engage in during a learning episode are based in science and they can show me data to show that the way that we're learning is going to be really effective, and there's graphs—I love that kind of thing. So that would really motivate me, but I don't know if data

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and graphs are going to motivate the average person. Probably not. I hate to say I don't know the answer, but I think it's important for me to acknowledge.

Megan Sumeracki (46:15):

I'm not really sure I know the answer. In that situation, asking the participants, "Did you enjoy it?" and finding out what about it is engaging for you is helpful—and just not mistaking that for learning, understanding that it's an important piece, but that's not the same as how much they learned can really help.

Celisa Steele (46:42):

Megan Sumeracki is co-founder of The Learning Scientists, which she manages with three other smart, motivated women who love science and data. Carolina Kuepper-Tetzel, Cindy Nebel, and Althea Need Kaminske. We encourage you to learn more about her and her colleagues' work at [learningscientists.org](http://learningscientists.org) and on Twitter as @ACEThatTest. On The Learning Scientists Web site, you'll find a blog, a podcast, and downloadable materials that can help expand your team's, your facilitators', your learners', and your own understanding of effective learning strategies.

Jeff Cobb (47:17):

In particular, we'll call out a blog post by Megan called "Elaboration As Self-Explanation." The post comes from a particular experience with high school teachers, but the benefits of self-explanation and the tactics for encouraging it apply to adult lifelong learners as well. At [leadinglearning.com/episode273](http://leadinglearning.com/episode273), you'll find a link to that Learning Scientists blog post on self-explanation, a link to their resources on six strategies for effective learning (which we highlighted in the last episode), a transcript of this episode, and more

Celisa Steele (47:52):

In the show notes at [leadinglearning.com/episode273](http://leadinglearning.com/episode273), you'll also see options for subscribing to the podcast. To make sure you don't miss future episodes, we encourage you to subscribe, and subscribing also helps us get some data on the impact of the podcast.

Jeff Cobb (48:08):

We'd be truly grateful if you take a minute to rate us on apple podcast. Celisa and I personally appreciate it, and those reviews and ratings help us show up when people search for content on leading a learning business. Just go to [leadinglearning.com/apple](http://leadinglearning.com/apple) to leave a review and rating.

Celisa Steele (48:24):

Lastly, please spread the word about Leading Learning. At [leadinglearning.com/episode273](http://leadinglearning.com/episode273), there are links to find us on Twitter, LinkedIn, and Facebook.

Jeff Cobb (48:34):

Thanks again, and see you next time on the Leading Learning Podcast.

*[music for this episode by DanoSongs, [www.danosongs.com](http://www.danosongs.com)]*

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