

## The eLearning Coach Podcast

### [How to Practice Evidence-Informed Learning Design](#)

- Connie: Hello learning people. Welcome to Episode 60 of The eLearning Coach podcast. I'm hoping that this will be the decade of maturation for the learning industry. Part of that maturation will involve disseminating and applying relevant research findings from the learning sciences. In this episode, I speak with Mirjam Neelen about the conclusions that learning researchers agree on, how to identify learning myths, and how to incorporate evidence informed learning strategies into your work.
- Connie: Mirjam is the co-author of Evidence Informed Learning Design: Creating Training To Improve Performance. She is a learning advisory manager with over 10 years of industry experience. In her current role, she leads learning experience design processes across Accenture's various business entities, globally. You can find the show notes and links to resources, and a transcript, at [thelearningcoach.com/podcasts/60](http://thelearningcoach.com/podcasts/60). That's the number 60. Here's our conversation.
- Connie: Hi Mirjam. Welcome to The eLearning Coach podcast.
- Mirjam: Hey Connie. Thanks for having me.
- Connie: I've been really enjoying your new book.
- Mirjam: Oh, thank you.
- Connie: It seems to be something that is much needed in our field. So I think you'll be helping people when they get a chance to read it and implement what you've written about. Can you explain the title of your book? What is the difference between evidence-informed and evidence-based?
- Mirjam: Yeah, so the title is Evidence Informed Learning Design. And there's definitely a reason that we chose evidence-informed and not evidence-based, although evidence-based is a more common term. If you want to go for the Google search results, it's better to use evidence-based. But we opted not to do that, because the evidence-based practice is grounded in medicine and healthcare. And it integrates the best available research evidence, around whether and why a treatment works, as well as clinical expertise and patient values. And it just works with high-quality quantitative evidence that they then use to make decisions around individual patient treatments.
- Mirjam: That's great, right, but in our field, we don't usually have that type of strong, high-quality quantitative evidence. So evidence-informed still means based on scientific research. But our field, in learning environments, we're just dealing with many different and often difficult-to-control variables that also interact with each other, even. So we

usually have to use more qualitative data. Things are highly context-dependent. Sometimes we can't measure what we need to measure, and then we use a proxy. So yeah, there's just less strong evidence usually and it's context-dependent, and we just need to be a bit more careful with how we handle the evidence and how we approach making decisions based on that evidence.

Connie: I like that. Another thing that I always think of is that humans vary so much. How can you consistently have the same previous knowledge? There are just so many things that vary within humans, so I can see why evidence-informed makes sense.

Mirjam: Yeah. Although I do want to call out that sometimes this is a reason that people say "Oh, our field is way too complex to even work with scientific evidence. The evidence is too weak, so we shouldn't use it." And that's definitely not the case. I would say on the contrary, because if we don't even try, then we will always be this field that is based on intuition and beliefs and preferences, and hopefully we want to be a bit more mature than this.

Connie: That is such a good point. This is our decade to mature, right?

Mirjam: Yes, for sure.

Connie: So for people who are new to the field, and I frequently come into contact with them, what disciplines would you say are part of the learning sciences?

Mirjam: Yeah, so the learning sciences is an interdisciplinary field. There's multiple disciplines that feed into the learning sciences. There's many different disciplines involved, but I'd say that major ones are cognitive science for sure, computer science, educational psychology, but also behavioral science, social science, information science. So yeah, a lot of different sciences.

Connie: It's pretty fascinating. I think that's what keeps us all so interested.

Mirjam: And busy.

Connie: And busy revising things.

Mirjam: Yes.

Connie: What are some aspects of learning that learning scientists agree on? Because that's a good place to start using the evidence.

Mirjam: Yeah. One is prior knowledge, right? Build on prior knowledge. Prior knowledge and being aware of that is critical to help people learn, because we all have previous experience somehow. We're not blank slates. So David Ausubel already said, I think it

was in the '60s, that what people already know is the most important single factor influencing learning, is what the learner already knows. So if we can find a way to help people build on their prior knowledge, or at least acknowledge that they have prior knowledge, that's great to take that into account in your designs.

Mirjam: Also, quite an obvious one, but still important, that you need to focus on learning and instruction, meaning that yes, high quality instruction is really important, but we all need to actively participate in our own learning process. Because without it, you won't get to the deeper conceptual understanding of what you've learned and be able to apply it. Reflection is really critical. The fact that you need to focus on learning transfer and not just on comprehension. So those are a couple of things that learning scientists agree on that's critical.

Connie: I like the way reflection is so tied up in almost all of it, because without thinking about it and without thinking about how it applies to your world and your universe, it just slips away. It's such a good way to elaborate and take things a little bit deeper.

Mirjam: Yeah. I've thought about this recently a little bit more, and I think we can even become more intentional about reflection, thinking about what different levels of reflection you have. You can reflect on different things like learning task, learning process, to just be a bit more intentional in your design, to help people to find different ways to reflect on different things.

Connie: I've heard some people who are creating eLearning, and I think I've done this myself actually, asking a question for people to reflect on and they don't give a response, or they could write a response, but it doesn't matter because...

Mirjam: Yeah, it goes into the black hole. Yes.

Connie: Right. And it's kind of funny, because even if you think that someone won't reflect, the human brain almost... Once they read the question, it will almost immediately come up with a little bit of an answer already. It's not deep reflection, but I just thought that was a good idea just to point out to people what they could think about, or in what way, without even asking them to submit something about it.

Mirjam: Yeah. I think if you ask people to submit something or to create an artifact, then you need to give them some feedback somehow or some opportunity to discuss it with somebody else, right? Because otherwise it's tricky, because it's not that creating an artifact or answering a question is not useful if you don't get a response, because it still encourages you to explain things to yourself or write it out. I think it's tricky and it always depends. That's going to be my standard answer. It always depends.

Connie: Well, that's what consultants always say. So you're good. Can you talk about a good way to differentiate between learning myths and research-based findings?

Mirjam: Yeah. It's all in the book. And I really like, it's very simple, I recommend the four steps of Willingham and I have discussed them now in different references or resources, but we'll use it in the book as well. So it means the first step is "strip it and flip it". So that basically means that, for example, if you see some kind of statement that you think, okay, what does this actually mean? So you think about, is the language emotional? Is it very strong? Are the words very strong? Is it hyped up? Is it based on some hype that's floating around? So those are all red flags. And then "flip it" means that you think about a statement: could it be true that the opposite could also be true? So that's one way.

Mirjam: And then "trace it," that's the second step means, that's very simple, make sure that you figure out where this information or statement is coming from. So are there any references, and then check the references. "Analyze it" is the third step that would require officially a bit of statistical knowledge but some common sense. If the percentages are all round, then you need to be suspicious, right? So very simple things like that. If you look at the numbers and they look all very ideal or artificial, don't be so sure that it's true. And then the last step would be, "Okay, should I use this?" Based on the steps you took previously, should I buy this? Would it be worth an investment? Should we do this type of thing in a design or in an activity or whatever? It's technology. Should we invest in it? So I think it's very simple, but I don't know. Now when I read an article, it's so easy to spot weaknesses, and I don't think so.

Connie: No. Julie Dirksen traced the goldfish myth, that the human attention span is shorter than that of a goldfish. I mean, that was everywhere.

Mirjam: Yes.

Connie: Tracing it back and tracing it back and tracing it back, and it turned out it came from Microsoft maybe.

Mirjam: I think it was some kind of Microsoft resource that claimed something originally. That was it.

Connie: And that was one where, okay, with learning styles you can feel your own preferences. So in that one it's a little bit harder to know that there's been no research to show that designing for a particular learning style is helpful. But when I read the goldfish attention span thing, it just made me laugh the first time I saw it, it was so ridiculous.

Mirjam: It's very ridiculous.

Connie: When it's really ridiculous, you just know from the start.

Mirjam: Yeah, but still, I'm sometimes surprised how people interpret things and how they then give it some kind of swing so that it makes sense to them, while to me it doesn't make any sense. So everybody looks at things from their own lens, I think.

Connie: This ties in with what I wanted to talk about next. What are the problems with translating neuroscience to learning practice? Why do we have to be a little bit cautious when interpreting neuroscience?

Mirjam: I'd say we have to be very cautious.

Connie: Let me back up for a moment. Can you give us an example of the type of statement that you're talking about?

Mirjam: All the statements around dopamine and learning.

Connie: Okay. Yeah.

Mirjam: So the problem with those, and I mean, I'm by no way a neuroscientist, right, but the problem from what I've understood... I've interviewed a neuroscientist for the book, and he has explained quite clearly that the findings from neuroscience have very little practical implications for learning. And what happens a lot is that people are somehow very attracted to neuroscience. I think it has some sexiness to it. I don't know what it is, but people are attracted to it. I think people are just fascinated by the brain, which I am too, so that's totally understandable. They just interpret what they read about neuroscience incorrectly, and then what's even worse is that they then attach practical implications to those findings.

Mirjam: Usually when you read about dopamine and learning, it's something around that you need to design unusual or fun or memorable learning experiences. And then the reason is that if something is unusual or fun or memorable, then that stimulates the release of dopamine. And then the release of dopamine is feelings of pleasure or satisfaction or motivation. I've even talked to somebody at a conference once who said to me, "I have designed an app that releases dopamine and then people get addicted to learning." That's just nonsense.

Mirjam: And what I was just saying about that dopamine is released when something is fun or memorable, it's just not true. We don't know that much about dopamine. We know certain things, for example that it is strongly involved in our fine motor coordination. But the idea that lots of dopamine gives people feelings of pleasure or satisfaction or motivation, it's just not right. Because dopamine is also involved in other, like fear. So it's also involved with negative things.

Connie: That is interesting. So I thought that interview with the neuroscientist was quite enlightening. Don't necessarily apply this to learning yet. And maybe in future years they will be able to figure out how it does apply, but right now we need to exercise caution.

Mirjam: Yeah. And I think even if technology will get better, et cetera, I think it will always be in combination with other types of research, behavioral-focused research. But one of the

things that I learned from him, Daniel Ansari is his name, is that the problem is not necessarily that people get enthusiastic about neuroscience and it is used almost as a vehicle to work more evidence-informed. I think the problem is that it gives us a false sense of evidence-informed practice, because it sounds very scientific and then people become enthusiastic and they don't even are suspicious in any way anymore and they think they're doing the right thing. I think that's the biggest problem with the whole neuroscience translation into practice.

Connie: Yeah, that's an interesting perspective. I see what you're saying. Let's talk a little bit about some practical approaches. What are a few key strategies for effective direct instruction and for providing feedback?

Mirjam: Yeah, so the first thing I would like to say is that if we talk about direct instruction, it's not about lecturing, right? Because that is a big misconception. It's not about lecturing at all. It is about carefully planned out, small learning steps with clearly defined and prescribed learning tasks. And it is also applicable for learning in the workplace, although of course not in all situations as it depends.

Mirjam: If we talk about effective strategies for direct instruction, it's things like give people an overview of previous learning, as I said, think about small steps in which learners can practice, asking a lot of questions and check responses of all learners to make sure that there is no misconceptions. So it's about asking the right questions as well to make sure that you give people an opportunity to explain the why behind things so that you can catch any misconceptions and address them. It's about the whole scaffolding model, guiding learning practice, check for their understanding, and then move into independent practice. So it's this whole flow of scaffolding. It's flow from high scaffolding to then taking it away over time.

Connie: I think it's important to point out that in technology-based training we also do direct instruction because we can give feedback to learner responses. We can actually address misconceptions for every individual.

Mirjam: Yeah, exactly. I think that's also a misconception, that multiple-choice are not effective in this context, right? I think this is a perfect example where multiple-choice can be really effective. If you are able to identify what common misconceptions are, then you can give people multiple choice with statements, for example. And if they select a misconception that's quite common, then you can give them feedback and explain why that is not quite right and what is the right answer and why.

Connie: That's true. And in some ways that could be better than face-to-face instruction because you're actually being able to interact with every single person to find the misconception, rather than in a classroom you get a sense of things, but you may not know what each person is thinking.

Mirjam: Of course. You don't know that.

Connie: Can you talk a little bit now about best practices for giving feedback?

Mirjam: So when we think about effective feedback, because I think we all agree that feedback is critical for learning, one of the things as a feedback-giver that's really important is that you are aware of the objective. What is somebody trying to achieve? So ideally you have a sense of their context as well, and not just about the learning objective but about how they need to apply it and what their work looks like. And also if you have a chance to observe them, to help them understand the gap between where they currently are and where they need to go, and what they need to do, how to get there.

Mirjam: Timing is really important and how you give feedback and when. It really depends on if somebody's a novice learner or a more advanced learner. So there's differences there. So there's a lot of considerations to make. It's a complex topic. Patti Shank has written a whole book on this. It's about practice and feedback, but she's going through all the research and it's not easy to translate to black and white recommendations. But there are some things that we'll know to be effective.

Connie: For example, for people who are novice in a particular domain or situation, immediate feedback. It's usually going to be better at the start.

Mirjam: Yes. Yeah. And more explicit feedback. So for advanced learners you can maybe give a hint first, but for novice learners it's usually better to explain it to them right away.

Connie: I want it to interject something here, that I did interview Patti Shank about Practice and Feedback and that is Episode 45. Now before we wrap up, I wanted to talk about one more aspect of instructional design and that is something that you mentioned in the book. It's really underused in workplace learning and yet it is often used in Kindergarten through 12<sup>th</sup> grade classrooms, and that is worked examples. In particular in math and science, you might see it. Can You explain what a worked example is and how it could be used in workplace learning?

Mirjam: So what it is, is a step-by-step detailed example of a "what", but also a "how" and ideally a "why" as well. So it explains to the learner how you can go about completing a task, for example, and it will show you, as a learner, each step along the way. And also not just what you do, but also how you do it and sometimes why you do it that way, if that's applicable.

Connie: Right. What's a practical way that someone could use this in workplace learning?

Mirjam: So the way I've used it myself is working with the subject-matter experts when I have identified a key task that the learner needs to be able to complete or do. Then I work with the subject-matter expert, I interview them, I let them walk me through what

they've done, how they've done it, so they show me. So, it's also about showing your work from the Subject Matter Expert (SME) perspective. It's difficult, right, because usually these people are really good at what they do. They have a tendency to skip steps and to say, "Oh, and then I just did this." So you have to pause and say, "Okay, stop. For you this is really easy, but you need to walk me through this and you need to show me how you did it and why you did it that way."

Mirjam: So, it is a big investment, and I think that might be one reason why it's not used very much. Although I also think that people are not aware of, necessarily, or necessarily know what a worked example is and how effective it is. Because to me it's not just about the worked example. The worked example to me is the starting point. But I think one of its other strengths is that you can then use it as a hook, almost, for the rest of your learning experience and constantly tie it back to remember what you saw on the worked example. And you can create templates out of the worked example to help people do it themselves when they progress. So really capturing, working with a SME, capturing it and creating all kinds of learning materials based on that example.

Connie: It's really important to find someone who is very competent or expert at a skill and have them think aloud.

Mirjam: Yes. In my experience I thought it was really intriguing, as in, at first they had a tendency to go, "Well, and then I just did this and then you just do that," but then when they got the hang of what it means to create a worked example, they got really enthusiastic and they started to create all kinds of materials and say, "Oh but then we need this as well and that as well." And you end up with a very rich suite of, a wide variety of learning materials that you can use not just as the worked example but in various other ways as well.

Connie: Isn't that interesting? I think a lot of people have not had that experience.

Mirjam: Maybe I'm just lucky. I don't know.

Connie: You are lucky. Anyway, Mirjam, thank you so much for explaining all of this, and I hope a lot of people will get your book. And for those people who are not doing it, it would be good to have an evidence-informed practice.

Mirjam: I hope so too. It's a bit of a passion of mine, as you might know. But that is the reason why I wrote the book, because I still hope that we continue to get better at that as a profession.

Connie: Yes. And I think it will help others respect our profession also.

Mirjam: Yeah, that's a really good point. Yeah.



Connie: So thank you so much, Mirjam. It's been a pleasure to talk about one of my favorite topics.

Mirjam: Well, thank you for having me, because it's one of my favorite topics as well.

Connie: I hope you found this episode valuable. I'm counting on you to spread the word. This is the decade when we have a greater impact on helping people learn change and improve performance. Why? Because we judiciously apply instructional science to our work.

Connie: You can find the show notes and links to resources and a transcript at [thelearningcoach.com/podcasts/60](http://thelearningcoach.com/podcasts/60). Take care, and I'll talk to you next time.