The eLearning Coach Podcast #43

ELC 043: Will you Design Intelligent Agents in the Future?
with Chris Noessel
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Welcome to the eLearning coach podcast, online at the elearningcoach.com. I'm Connie Malamed bringing new ideas and tips for success with creating online and mobile learning experiences.

Hello everyone and welcome to Episode 43 where we are going to explore the fact that the future is here. I'm talking about software we use every day is based on artificial intelligence algorithms, and the trend is growing. How will you be using AI in the future? Will you benefit from automation? Will you design AI software for learning? Will you be training AI agents? Today I interview Chris Noessel about a fascinating pattern or category of artificial intelligence known as agentive technology. Chris is the author of *Designing Agentive Technology: AI That Works for People*, and coauthor of *Make It So: Interaction Design Lessons from Science Fiction.* Chris is also a UX professional where he has designed products services and strategy for a variety of domains. Chris currently works with IBM as Global Design Practice Lead for the Travel and Transportation sector. If you don't know much about artificial intelligence and its impact on the future, you're really going to enjoy this episode. Here's the interview.

Connie: Hi Chris, welcome to the eLearning Coach Podcast.

Chris: Thanks, Connie, glad to be here.

Connie: You have written a book that will help us better understand artificial intelligence. I think we need to start out with some basic terminology. I know I spend a lot of time going through that in your book to make sure I had things in the right categories. Can you go through a few of the AI terms with me? One is just general artificial intelligence. Another term we hear a lot about is machine learning, and is that's different than deep learning?

Chris: Yes, it is all different, and it's incredibly confusing. So let me take a stab. I'll even give a quick forward to that answer, in that in identifying this pattern, the agentive pattern that we'll talk about, I found out that I had to go in and understand much more about the world of AI and about the field just to be able to situate what it was I was talking about. So, no surprise, that anyone's confused. It's kind of a confusing field.

In most of the literature around AI, people take pains to distinguish three very broad categories. The one that most people are familiar with is the AI that you see in science fiction, which for the most part is called general artificial intelligence. It's called that for a couple of reasons. One of the reasons is it's like your intelligence and my intelligence. It's a very loose category of human-like intelligence. There's also a reason why it's called that, in that that AI can generalize knowledge from one domain to the next. So the way that we become functioning adults is as toddlers we are learning about the physical world and we use some of those lessons in order to begin to understand some of the abstractions of the adult world, and little by little we build on that, generalizing as we go, until we have a model of the world in our head. We don't have that capability in AI at the moment. General AI does not exist. There is a massive first-mover advantage to the first company that gets there or the first organization that gets there. So a lot of people, including my company, IBM, are scrambling to get to general AI, but we don't have that in the world.

The second category of AI—I'm a visual thinker—to the right of general AI is a category called Super AI. This is an AI that will come after we ask the first general AI. In addition to all the other stuff that we're going to ask it to do for us, we're going to say, oh, by the way, while you're doing those other things, do us a favor and make a copy of yourself that's better, more aligned with our goals as a species, and make sure that that copy is also interested in making a copy itself. And once we set that ball rolling, that version will make another version of itself, which will make another better version of itself, and so on until it evolves to something that is practically unintelligible to us. The science fiction author Vernor Vinge coined that moment when we pass from a general AI to a super AI as The Singularity, because we don't know what life will be like having essentially a functional god in the world that you can talk to, and that you can equip to do things.

So if you're going to be scared of an AI, the super AI is the one to be scared of, because it can out think us at every turn, but by definition. And if it's a simple maximizer, then it's a great danger to us. So the good news is we're not at general AI, which means we're definitely not at super AI, and I do believe that we can do good work now in the third category in order to help those two things steer towards being better.

That third category, which is to the left of general AI in this invisible diagram that I'm describing, is called Narrow AI. And Narrow AI is good at one or two things very deeply, but of course it can't generalize. A Roomba vacuum cleaner is a good example of a Narrow AI because it has some very brilliant algorithms inside of it that allow it to maximize its coverage of any arbitrary shaped home in order to make sure that every part of it is vacuumed. Ask a human to

do that, and we can't do that, but you also can't ask the Roomba to help you plan a dinner. It can't generalize that knowledge or maximize right what movie would be best for the seven of us to see. It can't do that sort of thing. So Narrow AI is the third category, and it's the category we have in the world now. I work at IBM, as I mentioned, and the IBM Watson APIs, which are publicly available, are all Narrow AI that can do speech-to-text or text-to-speech or pattern-discovery or image-recognition. All those things are good examples of that constrained category.

So, first answer to your question, those are the big categories that we talk about. And if you're talking about the AI of today, it's narrow. The AI that people are aiming for and concerned about it's going to be General, and then Super AI as the super sci-fi stuff.

Connie: The great movies, right?

Chris: Yeah, it's really interesting. I happen to run a blog about science fiction and interface design, and I have noticed, partially because I look at movies that way the first time I see them, is that stories have begun to be told more and more about Super AI rather than General AI. And it's signaling for me a sea change in the way that certainly Hollywood and television is starting to think about and process the fact of AI. If you want a recommendation, *Person of Interest* was a fantastic show about a well-constrained Super AI, and I think it's fantastic. But it is Super AI that we're talking about there, and not the stuff that will be that I wrote about. I believe it's on Netflix now, and though that's not a permanent status, it's super easy to watch and binge watch. And the other reason I like to recommend that is it's very clear to me from having done my research on the field that the writers also did their research on the field. So though some of it is fictional, and it has to be, a lot of it is really well grounded. So it's a pretty good conversation starter for real world AI.

Connie: How about the difference between machine learning and deep learning?

Chris: Let me use examples. We've already talked about the Roomba, and some disturbing news came out about them yesterday, so I'm going to caveat. I like to use the Roomba as an example, but turns out yesterday that there are apparently explicit plans to sell some of the data traces that the Roomba develops. A little disturbing, worth talking about later, but I'm going to still use the Roomba as an example. A Roomba could be well designed as a piece of narrow artificial intelligence using that algorithm that we discussed. It maximizes its coverage of an arbitrary floor plan. But that does not necessarily mean that it learns. Machine learning is a

concept that says, hey, how does any particular system use its experiences to improve its performance on a metric and then get better? I guess it goes without saying. So in the Rumba example, if as the Roomba was cleaning your floor, it did a couple of things, it wrote that floor plan into memory, and then began to remember where the messy parts were, then it can keep a track over how much coverage did I provide to this floor and did I spend extra times on the commonly messy parts. And if it runs into dirt over the course of its track through your home, it could say, oh, hey, there's dirt that I didn't expect to find here, I will now record that so that next time I can be sure to hit this area. That is an example of machine learning, where it's not just hard-coded behaviors, it is behaviors that adapt to facts in the world.

Connie: So with machine learning the software actually gets smarter?

Chris: Yes. And the good news is, in the realm of Narrow Artificial Intelligence, the smarter it gets. the safer it gets. Not true with General AI. But we do want our narrow AI to be smarter because it's getting more powerful, and smarter means that there's less risk of bad things happening in the world. So that's machine learning. And it can be traced back to like the 1980s.

So it's not a new concept, it's one that we've been working with for a while. Deep learning is categorically different though not conceptually different. In deep learning, it's not a human that writes the algorithm that improves the machine, it's the machine that learns through looking at huge amounts of data what the salient patterns are, and therefore what should be optimized. Let me return to the Roomba example. Instead of having the little Roombas in your home discover what the best path for it might be, in deep learning you might share millions of floor plans with the deep learning algorithm and have it write its own rhythm that it believes is the most efficient for clean coverage. Then it can combine itself with machine learning in order to say, well, I know generally the best algorithm, and now I can add your individual preferences to that deep learning.

Deep learning has only been around since 2015, it's really new, and there's a computer developer/scientist Andrew Ng at Google who pioneered it, and it really depends on massive amounts of data in order to develop the initial algorithms. And for that reason, if you were to draw two line graphs of how machine learning performs and deep learning performs, machine learning can get you good results fast, but it plateaus fairly quickly. And deep learning does really, really poorly at its tasks for the very beginning of it, but once it builds up speed, it looks logarithmic and can do amazing things over the long term. And there's certainly a point where

machine learning hits its constraints, and that's really where deep learning can knock it out of the park.

Connie: That is really interesting. So your book is about designing agentive technology. And agentive technology—correct me if I'm wrong—is a subset of narrow artificial intelligence, or is it the same thing as?

Chris: No, it's a subset. If those broad categories are breaking up the field of AI according to what can the AI do, what level of intelligence is it, I'm looking at Narrow Artificial Intelligence and asking what is our—by which I mean the user—our relationship to that, and specifically where is our attention. As early as the 1950s, GE was investing in automation, and automation had as its stated goal the removal of the human from the systems, where the robot or the algorithms would just do the work and humans wouldn't even really need to worry about it unless it failed. And certainly when we really good functioning Artificial Narrow Intelligence, or even good functioning machines, we like those machines to take tedium away. One example that I like to use is a pacemaker. You never want to worry if that machine is working. You just want it to work. Similarly with an automatic door in a grocery store, you just want that to work as you approach it, there's no need for any additional complex intelligence.

The other side of working with Narrow Artificial Intelligence is assistive. If you are performing a task and you want an AI to sit on your shoulder like a guardian angel and help you avoid major problems or help you do the right thing or give you information just in time, it's assisting you with the thing that your attention is currently on. But over the past ten years or so, and much more so over the past five, I've began to notice a pattern that was in-between automated and assistive, and it was where things were doing their work outside of the user's attention, but for the user in the way that the user wanted, and persistently.

And I'll go right back to the Roomba, because that was one of the patterns that I had observed that sort of fit and helped clarify what I was thinking about. So in the case of the Roomba, it is categorically a vacuum cleaner, but there's all sorts of things that as a UX designer I would expect to find in a vacuum cleaner. There's no handle, there's no release switch, there's no power switch, there's no plug, and those are the things that you would expect or need for a vacuum cleaner that was for a user to use. But the Roomba, you set it up and you say, hey, this is when I want you to clean from this point forward. I want you to watch the clock and then go do your thing.

And while you're away at work or on vacation or out for the night, it does its vacuuming. And then when you come home, for most cases it's done. But that's not entirely true, because its

dustbin will fill up, so it needs to tell you, hey, my dustbin needs emptying. It will occasionally run out of battery and not be able to find its way back to its charging port, so you may find it forlornly sitting in some corner of the room. Or it may get stuck and when you come home it's complaining.

The other thing is that the Roomba isn't purely automated, because if you spill some cocoa on the floor, you can pick that Roomba up, put it near the cocoa and hit a button on its surface, and it'll say, oh, yeah, I'll clean here for you. So it is in-between automated and assistive, and I had to find a name for that category of thing.

There are other examples. I happened to be working on a Robo investor at the time that I was formalizing these ideas, where you tell it what your financial goals are, and you say this is the money I've got, this is the money I'll be able to contribute per month, and from that point forward the Robo investor helps you. Again, like the Roomba, it does its work, and you can step in to guide it, and it can alert you with problems. But, all told, it's managing the bulk of work for you. I had an automatic cat feeder, because I did a lot of travel as part of my work, and it did kind of a similar thing. I would set the cat feeder and while I was away I could be sure the cat would get food each day until I could come home and refill the hopper, and it helped keep my cat alive.

So all of these things were something that felt of a piece to me, and in thinking through what do I call that thing to distinguish it, I realized that we grant these things agency to act on our behalf. I grant the Robo investor the opportunity to manage my portfolio. I grant the cat feeder the opportunity to feed my cat, and I grant the Roomba the agency to clean my floor. So for that reason I call these things 'agentive' to distinguish them from assistive and automation. So you can break up Narrow AI that we were talking about according to the user's attention and the work that's being done in those three categories.

Connie: Great answer. In terms of software, we're online and we are getting suggestions from Netflix or Amazon or Google. Are they all using Narrow AI?

Chris: Definitely, it's all Narrow AI. Spotify and Pandora. But those were all actually deep and good examples of Narrow Artificial Intelligence that people can relate to, because they're taking a look at either the pieces of music or films that you have watched, or that you volunteer that you liked, or that you told it you are interested in, and it built something of a model of you, and then said, oh, you're going to like this then. And that might be just an assistant, oh, I'm looking to find a movie, help me find a movie, but in fact as agents they are watching every new thing that comes along, every new song or album that's put out, or every new license package that

Netflix has, and then recommends it to you. You may be interested in or Spotify's Discover Weekly. You don't have to ask it for that, it's going out and parsing that. My friends that have been using Spotify a long time say that they just love Discover Weekly. It's not only music that they genuinely love but that they would not have found without it. So the agentive aspects of those things are beloved and very valuable.

Connie: Just to review for listeners, agentive is going to be persistent. It's going to keep searching, going to keep looking at that data?

Chris: Yes getting down to a very concise definition or functional model of agents was tough, but ultimately I wound up describing them in terms of a collection of triggers and then behaviors. And the triggers are the things that you ask your agent to watch for. In the case of Roomba, it's the simplest of triggers, which is watch a clock every day at this time and act your behavior. And then the behaviors of things that you want it to do in the way you want them to do it to help you achieve your goals. And it's because of those triggers that are attached to behaviors that suddenly it is a persistent thing. And that's partially where their value comes from.

If I had to tell my cat feeder to feed my cat every day, it's not providing me the value that I need. If I had to even hop on an app from my office to tell Roomba, okay, vacuum now, that's not as valuable. That requires attention of me, it's a repeated thing, I don't need to do that. Or, another example, you can set up a saved search on eBay and I can say look out for Ted Baker shirts under $50 in the Bay Area and alert me when it comes. Having an agent helps you avoid the tedium of monitoring a data stream, filtering those for signal-to-noise and then deciding to act on it.

Connie: Let's take it into the workplace. Do you think that there's a way that agentive technology or software could reduce the amount of information people must actually learn to do their job?

Chris: It's a tricky thing for two reasons. First is that the job agreement that we have with our employers—if you're not self-employed—is that I am providing you skills and expertise and that's what you're paying for, in addition to the value that I get you. It could be sales, it could be good writing, it could be a computer program. But as an employee if I handed those off to a piece of software and that software was managing most of it, the employer would probably write to say, Wait a minute, why are you here? Which is a dark question that we have to ask culturally because we are falling headlong into the world of AI, and we should do that deliberately so that we don't suddenly wind up with a ton of people with nothing to do, no

sense of purpose, blah, blah, blah. And that's a fine ethical conversation that's important to have.

But let's pull it back to the near term question of a job. I would say that agentive technologies probably aren't going to be involved directly with the core work of someone's job. It will probably be involved in helping them watch for opportunities, avoid bad directions, and filter out signal from noise. And that helps answer the second part of the question, which is how could it help reduce the amount that somebody needs to learn for their job. To some extent, I am personally vested in not creating technologies that become a crutch for people, but that actually improves them, help them improve themselves over time.

So I don't want to say, oh, people will just be able to get just-in-time learning, that's probably really important for some short-term purposes, but for long-term I do hope that we all create tech that helps people get better, more sensitive, more able to do the things that the agent or the assistant is helping them do. So with that caveat out of the way, that agentive is probably a peripheral role in people's jobs and in their learning, I can see a couple of ways that it could help. One is it certainly can help do a lot of the monitoring and filtering that could consume a ton of our time for new information.

J. C. R. Licklider was a very influential writer in the mid-century. One of his most seminal articles was about a product called the Memex, which, if you look at it and read it and not pay attention to his implementation ideas, it's very similar to the way the internet, specifically search engines, work today. But for that paper, Licklider had done some very informal analysis of the own time and what he spent his time doing. And it wound up that he spent 85% of his time finding and collating the information, and only 15% actually thinking about and making decisions on and using the information.

And that number seems insane to us now in the world of Google and Bing and whatever search engine you use, but that was the fact just 60 years ago-- well I guess we're pretty close to 70 years ago. You can imagine that the next phase up is not even having to go to Google to find the next best thing that you need to know. You can say, look, I am an interaction designer, or I'm an author, or I'm a public speaker, hey, agent, I want you to watch every YouTube video that is posted on this topic, read every article, find excellent examples of people speaking, and then find the ones that match my needs.

I know that I speed up really a great when I speak, I know that I say 'um' too much, and I know that I can work on the sort of drama of my presentations. So look for good examples, filter out all the bad ones, and notify me that, oh, here's something that you might want to study that's

relevant to you. That thing means that even more than the 85% gains that Licklider would have got, had he been transported to our modern world, I suspect being transported to a world of agents means that it's next to zero time to find the most relevant information. That you need both opportunities, things you want to do, and perhaps the negative things, things you are doing that you shouldn't be and in that are leading against your own goals.

Connie: I do know of an AI curation tool. However, I doubt if it's watching the movies and I doubt if it's that advanced. It probably is just based on interests--

Chris: And metatags, yeah.

Connie: --and which ones you choose to read, perhaps it learns a little bit more.

Chris: And a lot of social analysis. They'll say everyone knows from Amazon "people who like this also like this", and that doesn't depend on the content at all, it's leaving the content analysis up to the people and just looking at the market data to infer what you might like. But in the future I suspect we're going to have more and more Narrow AI be able to analyze the content, just like Spotify and Pandora does for the music, it actually can read the song and say, oh, this one has minor chords, a peppy upbeat, and a breathy singer, and you like those things. So it's not just people who like Neko Case like this other singer, but, no, I am confident that you've never heard this musician before or this recording artist and you're going to dig her.

Connie: That's so cool. Chris, let's talk a little bit about design and what it would take to design software with these capabilities. What I'm thinking of is can we run through at a high level some of the phases of designing a fictitious agent of technology, something that learning professionals could be involved in. So I'm thinking of some software called Career Booster—for a un-creative name—it would be something where a user would submit and information, someone in the workplace would submit information about his or her career goals, and the software would track what the person reads, which courses the person should take, it provides ongoing work and learning opportunities for that person over time, and helps a person reach his or her career goals.

Chris: Love it.

Connie: Gee, I might design this some time.

Chris: [chuckles] I might use it.

Connie: Let's say the first iteration is for call center employees who want to move into a managerial position. We are designing Career Booster for these people. What goals and preferences and permissions would we need to design into this for the setup, can just give me a high-level idea of how we would go about thinking about design?

Chris: I don't ever mean to imply that agent would imply the abandonment of all the user experience design techniques. I think those things are still going to be pretty tried-and-true. The first phase would be research. Go out talking to call center employees, find out about what their frustrations are. Those that have been let go from an organization, I'd want to talk to them to find out what happened. Talk to people who have recently been promoted in order to understand how did you do it, what did you demonstrate, what did you focus on. And then talk to people who've been in the field a really long time in order to understand what they understand, best practices and long-term career paths look like. So with that research we could design Career Builder in order to have an initial conversation to understand what the individual call centers' customer service representative, what that person's goals are.

You mentioned another thing. You would want to know what are you hoping to demonstrate, and what individually do you feel you have a great deal of confidence in, and what do you feel you need to work on. There may be a difference there between what you actually need to work on and what you feel you need to work on, but it's still important information for the agent to know.

Connie: So then we would design it so that people would be able to input where they feel confident in, where they think that they need help. And perhaps we would even try to get a manager to input that information too.

Chris: Yeah, and I would say there's even a third: individual, a peer group, and then a third category is inferred facts in the world. So you can have an artificial intelligence agent take a look at that employee's call history. If it's rich enough and you have the recordings, it could provide a pass over those things and come up with its own list of, oh, for me you seem to talk too fast, or it might say, hey, you spend most of your time clarifying the problem, so if you can build on empathy. It could look at the manager's notes, it could look at social media in order to build its own model or what the performance is.

Connie: Wow, pretty exciting. Once we have that part designed, we want to design for the working mode. We want to design for the Career Booster to be out there doing its job

monitoring. How would that work, what kind of controls would there be, what kind of monitoring would it do?

Chris: I will take just a moment to remind listeners that for the job itself you would probably want Career Booster to be something of an assistant. So let's acknowledge that there is some parts of the system that I'm not going to talk about right now but that would be very useful. For the agentive aspects, what you'd suspect is it would monitor performance. So the recordings of the conversations, as we just mentioned, it would want to take a look at any peer reviews, and it might also at the same time be taking a look at best practices, who are the best performers who have done what you intend to do, in other words, get a promotion in this office with that boss over the next three months. And it would monitor all those things. It could—and this is a question that any designer would want to answer and pay close attention to privacy—but that employee, the CSR might also want to give it permissions to watch its communications with the supervisor. Say that an angry email was in the middle of being typed and from an assistive mode it might help get that email's points across, but an agent would say strategically, hey, hang on, anger is not met really well by anybody, much less this particular boss, so perhaps you ought not to do that. Monitoring the tone of those communications in the light of the CSR's goals.

At the same time it could do weekly check-ins, which says, hey, over the course of this week, this is what I saw, this is what you're trying to demonstrate, and you can see that there's a little bit of work we need to do here, why don't you take this course, or watch this video, or read this paper that talks about that very thing, and then you can work on it on the upcoming week.

Connie: One of those that I know, a part of the design would be the touch point, where would the user interact with the software. Perhaps you're saying that one of the touch points would be the user and the software would have some kind of weekly interaction to catch up and find out how the person was doing?

Chris: Yeah, that would make sense to me. And I'm basing that not on research, which would be the ideal, but just having had careers of one sort or another over the past 20 years, one-on-ones are the most common place for meetings with career coaches or with supervisors. So that'd be a fine place that I would think to start.

Connie: Would there be any other touch points that we would want to design in there?

Chris: Certainly, there's a series of notifications that I identify in the middle part of the book, so my brain is going right there. If the CSR had said I want a promotion by November, and it was

coming up on September, then there's a limited resource that's running out next time. So some opportunities to reach out to that person when either they're in the middle of doing something that is un-recommended, like the angry email, or they've just completed a short-tempered call from their side. Those opportunities to course-correct are going to be important for reaching out to them and saying, hey, we're running out of time, we need to step up this, that, the other, or, hey, you're about to do something, or even you just did something and we need to course-correct for that. So all of those notifications are things that I would expect.

It's also important many times over long-term goals like this to remind people of that goal. Goal chains exist in pretty strong hierarchies and we can get lost in the weeds. So, psychologically speaking, maybe every three weeks or every month to remind somebody, hey, not just have you completed these courses, what kind of Net Promoter Score are you getting from the guests or customers who you're helping, but don't forget what we're here to do is to get you that promotion so that you can have the extra money, so that you can put more money away, so that you can get on that vacation to Paris. Those things help people feel not just you are a nag, but that's right, we're doing this together going through this effort in order to achieve something. So I would also want to include that.

Connie: Wow, that's perfect. I want this Career Booster for myself [laughter]. Chris, I've kept you for a long time longer than I promised, let me just ask you one more question about the future if you don't mind. What kind of fields, what jobs do you think will open up as a result of the increased use of artificial intelligence?

Chris: If we're talking about-- let's constrain that to narrow.

Connie: You're right, I do mean narrow.

Chris: Because it would could get crazy if we talk about General, and who knows what the world is like with Super. I think there's one very concrete job that I know is exploding right now, and that is data science. Because of the efficacy, the long-term efficacy of deep learning, and deep learning requires data scientists, lots of places are going to be turning to deep learning to improve their products and services. And to do that you need an army of data scientists and AI programmers. I am neither of those things. I am a designer, an interaction designer, an author. And so I also see opportunities for-- as long as designers, content strategists, and writers can outfit themselves to work in the new modes—assistive, agentive, automatic, then they can be consultants to the organizations that are pursuing and developing these things.

I also in somewhat sci-fi sense see that-- and in the book I talk deliberately in a constrained way, though I don't mention it—oh, I guess I do it near the very end of the book—I talk about the world as if there were only one user and only one agent. But in fact that's not going to be the case. We are going to live in a world where one user has many agents. There will be some pressures on those agents to try and be the one that is top of mind. So I can see the Agent Wrangler maybe a weird job in the future where your agent is like saying, well, I'm looking at the twelve that you've got and I recommend you put this one foremost—not to completely just replicate Marvin Minsky's concept of the society of mind, but that's pretty much what it will be.

And, secondarily, even a trainer—and this isn't my idea, I should give full credit to the Near Future Laboratory, it wasn't Nick Nova, it was the other Nick present in Helsinki a couple of years ago, and he presented this notion of an AI Wrangler whom you could hire to train your robots. Oh, my Roomba isn't performing correctly, will you come in and make it do what I want it to do, so that it will behave correctly in the future. And whether that is that explicit, like come train my robot, or more implicit, you hop online and say I'm not getting the results from my Robo Investor that I'm looking for, can you help me? Because we're in the world of narrow artificial intelligence, humans will always be necessary to come in and troubleshoot some of those exception cases or to help steer the thing in the right direction when it's getting it wrong. So, off the top of my head, those are four categories that I can see.

Connie: And for learning professionals I can see helping to train robots, helping to do task and job analysis, and trying to figure out working alongside of programmers, and trying to figure out where agent of technology could fit in to somebody's workplace performance to take some of the load off. My imagination went wild when I read your book, it was really, really fun.

Chris: I would say that was some of the best feedback I could hope for. So thank you, Connie.

Connie: Thank you so much, Chris. It was really fascinating speaking with you.

Chris: Thank you so much, I enjoyed it.

I find this topic fascinating and I hope you do too. There's a lot to digest about artificial intelligence, and Chris's book *Designing Agentive Technology* is one of the better places to start learning about it. I think it's important that, as learning professionals, we are prepared to deal with every technology that comes along, and the only way we can be sure it is used to help rather than hurt our species is to understand it.

For a transcript and links to some of the cool stuff that Chris mentioned, you can find it at the elearningcoach.com/podcasts/43. Thanks for listening. I'll talk to you next time. Take care.