Hello learning people, and welcome to episode 26. In this session I speak with Abbie Brown, PhD, and Tim Green, PhD, about trends and issues in instructional design and learning science. When I discovered that these two have their own podcast on this topic, I immediately asked if they would be on the show and they were kind enough to say yes.

Abbie is a professor in the instructional technology program at East Carolina University. And Tim is a professor of educational technology and teacher educator at California State University, Fullerton. Abbie and Tim have authored several books together, including *The Essentials of Instructional Design.* In this discussion we spoke about trends in augmented and virtual reality, wearables, learning management systems, brain research, and a lot more. Here's the interview.

Connie: Hello, Abbie and Tim, and welcome to the eLearning Coach Podcast.

Abbie: Hi, Connie, thank you for having us.

Tim: Yeah, definitely we're happy to be here.

Connie: I'm a big fans of your Trend and Issues in Instructional Design Podcast. Can you tell me why you started it?

Abbie: Tim and I for years now we have been trends and issues guys for a yearbook called *The Educational Media and Technology Yearbook,* which is published by Springer. And it has come out for years and there is a section on trends and issues in instructional technology. We inherited the authorship of the chapter from Michael Molenda and Barbara Bichelmeyer from Indiana University. And Tim and I both being products of that school and they were our professors at one point, we took it over for them, what was it, Tim, about seven years ago, eight years ago?

Tim: Yeah, I think that's about when it was.

Abbie: And we've traditionally reported annually in that yearbook, but being able to work through a podcast and being able to curate media using something like Flipboard has given us an opportunity to report more immediately on breaking news and breaking trends. We still do the yearbook chapter, but that yearbook chapter has really become more of a synthesis of annual reports. For example, ATDs, state of the industry report. But the podcast gives us an opportunity to kind of bring everybody up to speed every two weeks.

Connie: It's a great cycle every two weeks. It seems like lately you've been concentrating a lot on hardware, and I guess that's because there is so much happening in that area. I want to talk a little bit about what you've seen in the worlds of virtual reality and augmented reality, but just in case some of the listeners might not know the different, can you explain what the difference between VR and AR is?

Abbie: Yes, we can explain our take on it, because both of those terms, virtual reality and augment reality, in terms of defining them they're still a bit up for debate. They overlap a lot. Would you say so, Tim?

Tim: One hundred percent, I agree.

Abbie: So virtual reality, here's how we're approaching it, virtual reality or VR is where the individual is placed into a completely rendered world that is like if you use for example World of Warcraft, which is popular enough people to get a sense of, that's virtual reality because you as the player drop into a complete sort of simulated world and interact with things. Even if there are people at the other end of those things, they're sort of mediated through their avatars.

Augmented reality is different. Augmented reality is where you're using some of these simulation techniques to literally augment the real world. The example I will use from the very early Google project, they referred to it as Google Glasses before they came out with Google Glass, I was at a museum in Washington DC and I was looking at a painting, and I held my smartphone up so the camera could see the painting and render it, and then it immediately looked up on Google what it could find about the painting. That's augmented reality.

Connie: And that's exactly how I see the differences too. Wiki Travel would be augmented reality and Oculus Rift would be virtual.

Abbie: Exactly. There is a new thing that we just recently reported on called Mixed Reality where designers are trying to take advantage of things like the Oculus Rift experience but are cognizant to the fact that one may have to pause out at least long enough to see somebody directly in front of them.

Connie: What kind of trends for learning and possibly workplace training do you foresee with virtual reality and augmented reality?

Abbie: Walter Cronkite would disagree I'm sure, but I feel like Walter Cronkite saying 'this just in' [laughter]. Google Glass was considered sort of a completed project as of midyear, but they've just recently announced that they're doing something called an Enterprise Edition, they're calling it Google Glass EE. So we're seeing the sort of redeployment of Google Glass technology which is very much an AR situation for the workplace, because what they're doing, at least from I've read, is they're beefing up the battery power but it's actually then a battery pack that one wears separate from the glasses. And that will allow for more time spent with the Glasses on. I have a pair and they typically burn out after about ten to fifteen minutes. But if you're working all day, if you're using them, say, in a shop and you're using it for the AR experience of looking down at some complicated display and making greater sense of that display using the AR, then the Enterprise Edition of Google Glass is going to be incredibly helpful there. So, again, that's kind of putting on a brand on it. I think that there are a lot of competitors also working on similar activity, but then we're seeing it more for the enterprise and less just for people's personal enjoyment.

Connie: Tim, do you see any applications of VR to the workplace training or support?

Tim: I'm not a hundred percent sure. There are a lot of different tools coming out, I think it's still too early. I've got to admit Abbie is the VR, AR expert of the two of us, so I always defer to him when we talk about this, he has experimented more.

Abbie: Tim is real, I am virtual. [laughter]

Connie: One thing I can think of is perhaps like simulators, something like that.

Tim: I mean you also see coming out too with the HoloLens from Microsoft, they're experiment with-- one of the last things, and I think we actually flipped in this our Flipboard magazine, was about the human body and looking at the skeletal system and all the way through until you see a total human with skin on and being able to manipulate a heart and look at the heart and do those things. Again, it's early, it's early

in the process, so I'm not sure it would actually be used in the workforce but there are definitely experiments happening with this type of technology.

Abbie: Yes, I think Tim's right. The HoloLens example is a good one in terms of teaching. Using the human body as the example, medical instruction is going to change. Flight simulators have been popular for a long, long time, and they will continue to get better. They've just recently shown—I must admit I forget where—but there is a new group that just came up with a really immersive flight simulator that I totally want for my living room. But the ability to do these things less expensively and with much more comfortable equipment means that we're going to see it happening in a lot more places. I'm wondering, just based on a current trend in globalization, the idea of expanding a workforce beyond a specific culture, I'm wondering if we'll see more use of VR to introduce aspects of culture that new employees may not have experience with up to that point.

Connie: I love that idea.

Tim: To add on to that—it's not necessarily work related but I think it has some possibilities—if you haven't seen the HoloLens example of Minecraft, now it is being used with Minecraft, what I find interesting about that is now you have two people working together in that environment, and if you haven't seen the video look it up on Google or go to our Flipboard magazine because we flipped it like three weeks ago, and showing two players in the same world in Minecraft and it is unbelievable how they are interacting.

Connie: Could you explain what the HoloLens is?

Abbie: It's kind of like Oculus Rift for those people who are aware of it, expect that in the case of VR, true VR, you're putting on basically a set of goggles that you can't see the rest of the world from. If the goggles were turned off completely, you would just see black. A HoloLens is an AR experience where if you put them on you will still see the world even if they're not turned on, but when you turn them on it adds on overlay to the world.

Connie: So that's almost like AR.

Abbie: It is AR. One of the things I anticipate people using that for is city planning. Like New York City has a massive model of the entirety of New York City where they just run

simulations for lighting to make sure that new buildings won't cause a problem for older buildings. But you'll be able to do a lot of that using something like Oculus Rift.

Connie: That is amazing. Why don't we move on to the Apple Watch. Do you think many people will be using that for performance support, do you see any applications for that in the workplace, and other watches similar to the Apple Watch?

Abbie: So wearable devices. We were all about wearables for about ten episodes, Tim?

Tim: Yeah, it was a long time.

Abbie: Well, over to you Tim, what do you think of the watch?

Tim: I think it's pretty cool. The wow factor is definitely there. I think in this iteration I see people experimenting with it on a smaller basis, but right now the potential is there but I think it hasn't been realized. Abbie and I were talking about this before our last podcast episode, it's just the cost point, the price point for it, it's too high for people who are going to use it for training and education to actually buy it and use it. I think if it comes down more people will be experimenting with it. We've seen universities, I believe Pen State, we flipped one about Penn State, an article where they're using these devices to look at how students use it and relate it to their course work. So I think there is those studies coming out. I think there is promise but I don't think it is being realized yet with wearables. I think that's kind of where we are with it.

Abbie: Yeah, we are. The other thing you and I were discussing, Tim, and I know you're wearing, not an Apple Watch, but I know you're wearing one even as we speak, I think right now they are a little too clunky to be subtle, and we need to get to a point of subtlety with them. If you a take a similar example and you say most people now are carrying some kind of mobile phone, the vast majority of Americans have some kind of mobile phone device that they carry with them all the time, but if you rewind the clock about 20 years, you have a few of the really early adopters carrying bag phones or really massive, clunky, brick-like pieces that were useful and were kind of fun to experiment with and you could see the future in their use, but they weren't quite there yet. And I think that's where we are with these more sophisticated wearable devices. I would love to be experimenting with an Apple Watch right now, but I can't justify the expsense for practical purposes.

Connie: I understand that. But the screen is so small, what's an example of how it could be used?

Abbie: I think the example is going to be that subtlety factor, I think it's going to be something that if I can sit in a meeting and get a quick, subtle notification or reminder, that would be helpful. If all it does is remind me to take out my smartphone then it becomes less subtle and difficult. In terms of that tiny, little form factor, in terms of the size of the screen, that is a really good question. I don't think we've answered that question yet.

Connie: Why don't we move on to a screen that's usually a little bit larger and more amenable to some kind of support and perhaps learning, and that's mobile. What kind of trends have you been seeing in the arena of smartphones and other mobile devices?

Abbie: I seriously do defer to Tim on this one. Tim, between the two of us you're more involved in mobile device research.

Tim: So, Connie, are we talking in using it for educational purposes?

Connie: I am using it for educational, workplace training, I think it's great for performance support, but I've just been wondering if there are some trends that I'm not aware of or that the audience isn't aware of yet.

Tim: I think that even in from K-12 into business industry, everyone is scrambling to make their content accessible on it. They see the benefit of having that device and being able to access training and support and learning wherever the learner may be. So I think that's the key. How do we make it so that it's easy to use and can have some of the same functionality as, say, a laptop of a desktop and putting it in there? So to me the trend is they're going more towards using that device. So I definitely see it in K-12 because bring your own device, students have it, how can we take advantage of that when there are away from school, or when workers are away from the workplace how can we use it. So to me the trend is, and it has been for a while, to make that content easily accessible on that smaller device. Or if you have, like my wife has the iPhone 6 Plus, it's not so small, she says "it's like iPad mini up to my head" so I'm just making it accessible.

Abbie: I think it's a huge opportunity for us, for eLearning professionals and for instructional designers. One of the initiatives of course is to make a transition over from using learning management systems that currently exist and making them more accessible using people's mobile devices.

Tim: Exactly. That's a huge trend right now.

Abbie: But the design isn't there yet. I see some very clunky attempts to sort of marry the traditional learning management system interface with a mobile interface, and it's good but not great, and I think it's a huge possibility, an opportunity really for people within our field if we can get one or a few people to come up with a really effective design.

Tim: Adding on to that, what we've done pretty well with this or we've done fairly well is displaying the content and getting students access to content, learners access to content, but it's the interaction, that's really clunky in my experience. Students responding to the instructor, the interaction piece of it, the engagement piece is extremely clunky. We can view content pretty well, but the engagement is not there with the….

Abbie: With the learning management systems that I've observed so far, it's great for administrative tasks. If you want to check your grades, you want to post grades, no problem. But, like Tim said, as soon you want to engage in something like a discussion forum traditionally housed within a learning management system, it becomes difficult to follow what's going on or to add to what's going on using the current interfaces.

Connie: Yeah, that's interesting. It would seem like the typical chat functionality might work, but maybe that's not threaded enough, I'm not sure.

Abbie: Maybe, I felt the same thing actually, and I was surprised that a more basic chat mode wasn't enabled. It seemed to me that that would be a great way to do it. But what I've actually seen more is an attempt at greater sophistication in displaying the thread, but the sophistication of the thread display actually creates a problem for participating in the discussion.

Connie: Interesting. One area of hardware that I'm just so excited about, and of course I can't afford to have one yet, but it's the 3D printer. It just seems like it can open so many possibilities. In terms of creating and inventing, yes, are there any application in the workplace?

Abbie: That's a really interesting question, and I do have a 3D printer in my office, huge shout out to the College of Education at the East Carolina University for supplying that for me. And I've been experimenting with it for a few years now. I must say that I look at it more as a teaching tool for K-12 situations, and possibly higher-ed. I haven't seen

anybody applying it as a tool in business or government right now. Mostly the instruction has been about how to use 3D printing, not how to employ printables within the instruction. It's really new technology from a consumer level. The additive printing model has been around for decades. The fact that we've got it now in very small devices, the 3D printer I have in my office is roughly the size of a coffee maker, and it makes about as good coffee as my old coffee maker.

Connie: Anyone who is interested in prototyping products, it's great for that. And I can see how K-12 has some good applications, because the kids get to invent, but maybe adults need that too, maybe it would help to spur creativity if we had 3D printers in our offices.

Abbie: I think you're spot on. The current research that has come out within the last year or two has been about how use of 3D printing tools helped people expand their own creativity and their own academic success. It's one of the reasons that we want to try to get 3D printers into the classroom around middle school. But I don't think that it stops at the middle schools level, I think that anytime one works more with three dimensions one is expanding one's cognitive capability.

Connie: That is true. It is much harder to work in three dimension. I don't think I did too good in my sculpture class in college. Why don't we move on to software trends, and I know in your podcasts and Flipboard you have been talking about bots and other automation tasks, can you talk a little bit about the trends that you see going on there?

Tim: I don't think we've got a whole lot of that. I think really what the automation tasks from a learning perspective is, is from a design point of view, how can we automate tasks that we do from developing courses. That's what I remember from that. And also from the point of view of responding and giving feedback, can we automate feedback to learners as well, what can you add to that Abbie?

Abbie: For me there is a personal prejudice here. I'm very much against automated tasks in developing instruction, especially in providing feedback, although even saying that I realize that if it's an eLearning situation and one is setting up sort of programmed instruction, then we really have to find good ways of providing reasonable feedback that's automated. But it's not my major area. I tend to be more of a bespoke designer, where I tend to cut the cloth to smaller groups.

Connie: I know what you mean. What about learning management systems, what kind of trends have you been seeing there?

Abbie: We both just came back from the International Society for Technology in Education conference, and although that is focused on K-12, it was a very interesting indicator of the range of new learning management system options that are out there, and now I'm going to shut up and let Tim talk as he knows more about this than I do.

Tim: I think one of the trends that we've seen at least over this year and last year as well, and it's even longer than that, but really this year one of the things that I've seen and I've actually observed this when I talk to IT folk and teacher in K-12 and higher education is analytics. LMSes, that's one of the big things that they come up with, all the analytics, what can we track with students, their learning, and really it goes along to the idea of making the system adaptive and personalized, and if we know analytics about our learners what they're doing, what they're leaning, how well they're doing. We can personalize the learning through the LMS as we make it adaptive, because one of the trends that we've noticed that has been going on for the last year to two years is personalized learning, and I think that goes K-12 all the way through into business and industry making personalized learning, but I think analytics is a huge trend with LMSes.

Abbie: At the adult level even the ability to just be able to analyze when adults are entering the system, how long they are staying, not to take attendance per se, but to understand how people are employing the system and design better for that.

Tim: Yeah and, to add on that, what pages they're going to, what content they're at least attempting to look at, because obviously we don't necessarily know whether they're looking at it if they're on a page, but--

Abbie: But what page do they return to. I use the analytics to figure out where my instruction is problematic by looking at where people will go off to something else then they have to come back to some page. And if they have to come back a dozen times, that throws a flag out for me saying I wonder if I've explained things correctly here.

Tim: I think the other trend too that we're seeing with the LMSes, it's also flexibility and integration with other tools, whether it be Google Drive or the Google Docs or different Web 2.0 Tools, and beyond, how these LMSes can integrate with these different tools. And so how you can add on, almost like building blocks, add on to an LMS. I see that as a trend as well, so I think playing nicely with other tools is another trend with LMSes.

Abbie: From the instructional designer's point of view or the sort of the instructor who is present for the courses I think the thing to keep in mind right now is that we shouldn't

marry ourselves to any one product, it's no longer a single elephant or two in the room, there is a lot of competing products out there right now. So we have to maintain a level of flexibility in terms of what we're ready to use.

Connie: What kind of trends are you seeing in terms of learning, games and gamification?

Abbie: The first trend is that everybody is just head over heels in love with the concept.

Tim: Exactly.

Abbie: And they have been for about a decade. This is where a lot of people have really made their careers in the academic world is focusing in on gaming as instruction. And for good reason, there is a lot of real, great promise here. But, again, it's one of those things we still haven't seen fully realized. We haven't had the sort of breakout killer app that says this is proof that this really works the way we think it will.

Tim: I think one of the things related to that is digital badging, I see a lot of that being tied to it. That kind of trend is huge now, digital badging, and I think that came of out gaming sort of, it's related to that leveling up and getting points, earning distinctions and badges. To me I put it sort of with gaming, that's a trend now as well, it's huge.

Connie: One of the reasons I think that it hasn't one hundred percent taken off is because they're hard to implement. So that won't work with large teams and had programmers on staff, that was one thing, but now that often people are in a one or two person office without a programmers, it makes it a little bit harder.

Abbie: I think you're right, it's very easy to overlook the need for the big team to make something really good in terms of media. One person working alone is going to have a tremendous difficulty crating something that rivals World of Warcraft or anything that has got those massive teams of people that are working together. So it's hard to come up with something that is truly useful. And given the time available, a single human being as a resource probably needs years to come up with something that a team of 100 or 200 people can come up with in a few months.

Connie: The second challenge I find is that not all adults want to play a game, they're very busy, and they just want to get right in there, get the information and get out. And also I do a lot of medical eLearning, and we are starting to do more of what I call fake games or superficial games just to make it more interesting, one problem I see

sometimes in medical, the topics are pretty serious, it was really feeling like playing a game around death.

Abbie: That is an excellent point, although I must say, as a counterpoint to that, I was consulting with some professionals in our medical school this past month and they were pointing out that by the end of the day they had been through so much very serious, very traumatic activity, that they wanted to lighten things up a bit. So they preferred gaming in some less serious approaches because of the nature of their work throughout the rest of the day.

Connie: That's pretty interesting. I do find much more acceptance, but I hadn't really thought about it in terms of let's lighten things up because you day is so rough. It is a tough job that is for sure.

Abbie: And of course I think it heavily depends on the content that you're dealing with. The folks that I was dealing with were working mostly on building their vocabulary in other languages so that they could speak with patients.

Connie: Sure that would be great for a game. Have there been any insights about how people learn that have just been kind of mind-blowing, or anything about trends in the research that's going on?

Abbie: In terms of mind-blowing, no. Of course what happens is—and we see this in reporting trends and issues for instructional design in general—technologies change rapidly, but human beings don't change very much year after year. So discoveries are very slow in that regard. The intersection is the technology that allows us to actually observe brain activity. And so what we're seeing currently is a lot more information available from research being conducted by neuroscientists. As an example, one of the most recent articles that we reported on was the ability for scientists to actually view memories forming, and that's fascinating. It tells us that we can identify how the process occurs. It doesn't tell us quite yet how to develop instruction that supports the process.

Connie: But if you can see it forming then you can maybe ultimately do some kind of experiments that make it form more quickly or make it persistent.

Abbie: Right. And I think what we're going to see is more experiments that show what we need to avoid to make sure that the memory that forms is a strong memory in terms of what we're targeting. My mother's favorite example of this was when she was hypnotized once to cut down in eating, back in the 70s, the hypnotists asked her what

she had for breakfast that morning, and she had had an unusual breakfast that morning of a slice of salami, because she was running out of the door. So from that point forward she never enjoyed salami again because that was the focus of the hypnotic suggestion. And it had no effect on my mother because she didn't really like salami. So we're still in that phase where we're saying we can observe memories forming in this way, now what can we observe in terms of distractions so that we don't overload the system and make sure that the memories that are forming are the ones that we're hoping will stick with an individual.

Connie: Do they have a location like the hippocampus or do they say where the memory was forming?

Abbie: I wish I could report with greater expertise, but I suspect that they are able to do that based on the viewing technology that I'm aware of, but I'm not sure where it was actually being observed.

Connie: Interestingly, it seems as though so many things are distributed across the brain, not necessarily just in one location.

Abbie: That's how they were able to observe the formation of the memory, they were showing people familiar faces of famous people with familiar locations, so they might show Brad Pitt in Paris, and they were watching people's memories form by taking two preexisting memories, one of Brad Pitt, one of Paris, and blending together. So they were watching it across sort of neural distance.

Connie: And that's why we have learners bring up some previously learned information.

Abbie: Exactly. But the question then becomes what previously learned information facilitates this, and what previously learned information distracts from this.

Connie: Have you seen anything recently about embodied cognition, that's just a subject that I've always found fascinating, it has been let out of the cognitive model.

Abbie: Isn't that weird that it doesn't get more play. Embodied cognition seems to be a very modern approach in terms of just our overall philosophy about how things work. Tim, again I bow to your expertise, but that means I'll talk first and you can blow holes in everything that I say. I think we're still seeing people grasp the difference between a behavioral approach and a cognitive approach, and that we're trying to put constructivism somewhere within those two approaches. That has been the big

discussion for about 15 years, and I think until everybody gets more comfortable with that it's hard to move on to the next step.

Tim: I agree with that, you're right on. The interesting thing is it's because we're comfortable with those too. To me embodied cognition is more of a grey area, it's a mixture of things, people just aren't comfortable with it. In trying to use it to design instruction around, it's not easy to do. I still think, like Abbie said, we've been talking about these issues for years and the fact that with embodied cognition—I'm not by any means an expert on this—but the idea that our environment plays an impact on our cognition, that has been around for years.

Abbie: But even popular media separates the brain from the body, so it's difficult to understand. If Mr. Spock is the embodiment of all things cognitive, even if we're looking at any episode or movie that has Mr. Spock in it we never see him saying, "Ah, yes, my brain and body are one." So even the popular media we don't have a good way of understanding the concept of embodied cognition.

Connie: But at least they can do mind melds, and that's pretty important.

Abbie: But, again, mind to mind, he never says body to body, although he does have to reach out and touch somebody. So it belies the actual presence of an embodied cognitive moment.

Connie: Thank you so much Abbie and Tim. It was just so great speaking with you.

Abbie: We're big fans of you as well, and we're just really happy to have the opportunity to chat with you today.

I hope you found the discussion valuable. Don't forget to check out Abbie and Tim's podcast too. You can find a link to it and to other resources in the show notes at theelearningcoach.com/podcast/26. Thanks for listening, talk to you next time. Take care.