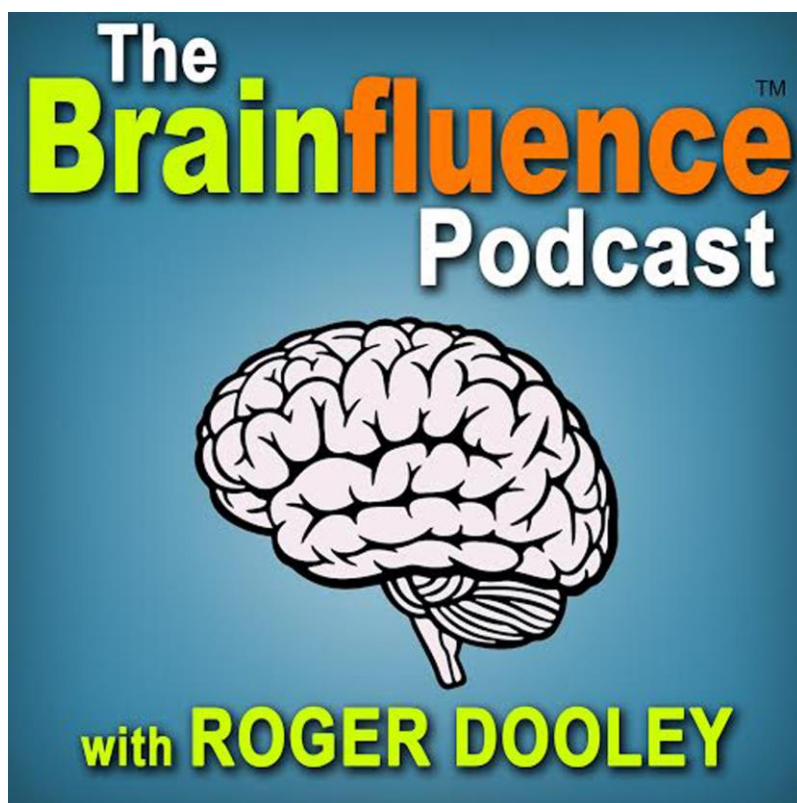


Ep #110: The Surprising Way to Become a Real Expert



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Roger Dooley

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Ep #110: The Surprising Way to Become a Real Expert

Welcome to *The Brainfluence Podcast* with Roger Dooley, author, speaker and educator on neuromarketing and the psychology of persuasion. Every week, we talk with thought leaders that will help you improve your influence with factual evidence and concrete research. Introducing your host, Roger Dooley.

Roger Dooley: Welcome to *The Brainfluence Podcast*. I'm Roger Dooley. You know that most of our guests here on *The Brainfluence Podcast* are experts. We've had persuasion experts, conversion experts, leadership experts, marketing experts, and lots of other experts. So you won't be surprised to learn this week's guest is an expert too. But, you might be surprised at his area of expertise. He is, in fact, an expert in expertise.

Our guest is one of the world's leading researchers in that field of expertise. He's a psychologist and a professor at Florida State University—Go Noles. He's collaborated on research with one of my idols, the late Herb Simon, Nobel Prize winner and long-time professor at my alma mater, Carnegie Mellon University.

Our guest is also an expert in working memory and long-term memory, in particular as it relates to the development of expertise. His work has been featured in Malcolm Gladwell's *Blink*, one of my favorite books. His own new book, co-authored with Robert Pool is *Peak: Secrets from the New Science of Expertise*.

Most important for our listeners I think is that our guest and his new book give us a very optimistic message. As humans, we aren't limited by our

Ep #110: The Surprising Way to Become a Real Expert

genetic gifts. With the right kind of practice, we can learn skills that were previously thought to be part of our DNA. He offers practical ways for all of us to improve our abilities, whether it's learning a language or how to play a musical instrument. I could go on but let's give our guest some air time. Welcome to the show, Anders Ericsson.

Anders Ericsson: It's a pleasure to talk to you.

Roger Dooley: It's great to have you on. I think that expertise is a fascinating but often unscientific topic. Everybody seems to claim to be an expert in something but you've taken a very scientific approach to expertise, what it constitutes, and how to develop it. How did you first get introduced to the field of expertise, Anders? What caused you to get involved in this?

Anders Ericsson: I think if I really go back, my first kind of study here of looking at how much an average college student can improve their memory was kind of the starting point. I think we found some really amazing performance that this one student, and then we replicated with one of his friends. How he could actually improve his memory by ten to twentyfold.

I think what is interesting is that a lot of people believe that there are these general capacities like intelligence and memory. By not understanding how they actually work, it's also impossible to see how you can improve them. So what I think was kind of the starting point was this finding that being able to improve memory for a particular type of material twentyfold is possible.

Ep #110: The Surprising Way to Become a Real Expert

That led us to the assertion if you can do it for one type of material, then we also argue that you can do it for any other type. But it's not like you're training on one type of material and then your memory gets better for everything. It's more this adaptability of being able to actually improve one particular aspect if you set it up correctly and then engage in the type of training that basically the teachers know is effective for this particular aspect.

Roger Dooley:

I guess we think of some things like musical talent, like Joshua Bell or Yo-Yo Ma, as being primarily sort of a genetic gift. That these people were born to be genius musicians, obviously amplified by practice and training. But there's also the skill of perfect pitch which as many professional musicians have, and conductors, but most of us don't. That's the ability to identify any note when you hear it, even outside of its normal context.

Obviously as a conductor or a professional musician, that's a very useful skill. But it's always been assumed that that was something that you had or you didn't have. But your work found that it can be developed, right?

Anders Ericsson:

Yeah, and I think that's a very interesting perspective that when you're looking at some of these very high-performing musicians performing as relatively young children, once you start looking at their developmental history you find that that's quite different from basically lesser-performing musicians. That's why we argue that at least the amount of practice and the type of practice that these

Ep #110: The Surprising Way to Become a Real Expert

individuals engaged in seems to be sufficient to explain why they are different.

There seemed to be certain things that you can only acquire as a child. A perfect pitch is one of those things. If you actually get musical training between ages 3 and 5, so you actually learn to differentiate tones, there is research now showing that any child with the right kind of training can actually acquire perfect pitch during that age period.

As you get older, the brain actually starts growing in different directions and it becomes almost impossible for older adults to actually acquire perfect pitch if they missed that developmental window between ages 3 and 5.

Roger Dooley:

It seems like language skills, the ability to learn multiple languages, are kind of similar because if you learn a language as a young child, you can learn it without an accent. Where most skilled adult language learners will never be able to shake their accent. Is that really the same type of thing going on in the brain?

Anders Ericsson:

I think it is sort of similar. I think when it comes to accents, it's kind of interesting that as you develop skills as a child and adolescent, if you're actually learning a new language at an older age, it's almost going to be now in the context of your language skills for your first language.

Whereas if you as a child then you can actually basically learn it in the same way as you're learning your primary language and that seems to have a big

Ep #110: The Surprising Way to Become a Real Expert

impact on your ability to be able to speak it without an accent. So early acquisition allows you to somehow learn the fundamentals of the language in such a way that you can then acquire it and speak it without an observable accent.

Roger Dooley: Anders, the term cognitive adaptability is central to your book. Can you explain what you mean by that?

Anders Ericsson: What we're finding is that most of the skills that we look at are actually being built up using kind of sort of building up a foundation on which the skill is being acquired. What we find is that if you look at skilled individuals in a domain, when they start out in the domain, we find cognitive ability and performance and IQ tests actually correlated with how well they do in the beginning.

But as they are acquiring skills, it seems like these new skills that are being acquired are replacing the role for any of these kind of more general abilities. So when we're analyzing skilled individuals, it's not like somebody with a higher IQ are performing better within the domain among skilled performers.

Roger Dooley: So initially they're depending on whatever innate skill they have but over time their brains in essence are adapting to this new skill, forming perhaps new networks, and growing, and so. That is where their long-term skill comes from.

Anders Ericsson: That's a really nice summary.

Roger Dooley: Given that our brains are adaptable and the key to developing expertise is practice, most of us practice

Ep #110: The Surprising Way to Become a Real Expert

fairly ineffectively it seems. We repeat the same activity over and over again.

If I was going to practice golf I would say perhaps try and play as many times a week as I could. Really though, according to your book, Anders, that's the wrong way to go about practice as just sort of repeating. Even though you will get better. I mean if I played golf every day of the week, I would no doubt improve somewhat. But in terms of the right way to practice and learn a skill and really sort of get to that next level, that's the wrong approach, correct?

Anders Ericsson: Yeah, what we would recommend is that you talk to a teacher. A teacher can now assess and see where you're at on the skill continuum. Then actually recommend here, "Well, in your situation, you should focus in on this particular change." Then come up with training activities that actually would allow you to achieve that particular change.

That is something that we call the deliberate practice, when a teacher is actually telling the student here about training activities with particular goals. Then the teacher remains in contact with the student so you can actually sequence and actually building, and gradually improve performance.

Roger Dooley: The number recall experiment you referred to before, that involved that kind of practice, correct? It was sort of a repetition and feedback loop that enabled your student to just memorize fantastically more numbers. Because while most of us can remember probably seven numbers fairly reliably,

Ep #110: The Surprising Way to Become a Real Expert

that's why the phone company originally used seven-digit phone numbers. Initially, your student had pretty much that ability, maybe eight, maybe nine occasionally. But that was about the limit. With this repetitive practice process, you were able to greatly extend that. Can you describe what happened?

Anders Ericsson: I think this is kind of maybe the most important idea in our book is that in order to really change your ability to hold onto numbers, like a phone number that you're just going to dial. We refer to that as short-term memory because you're not trying to remember it for the rest of your life. What we found was that in order to really expand beyond those seven or eight or nine digits, you really had to change how you were approaching the memory task.

We found that our student spontaneously actually started grouping three digits in a group and then trying actually to connect that up with information that they had in long-term memory. This particular student was a long-distance runner so he tried to look at the three digits as if they were running times and actually then really give meaning to those numbers.

By basically working on one group of three digits and then moving over to the next one, he would be able to actually put that information in long-term memory. That allowed him to recall strings over 80 digits long perfectly.

Ep #110: The Surprising Way to Become a Real Expert

Roger Dooley: Yeah, which is a really remarkable task because it was like one second between numbers. So I'm sure most of us would fail horribly at that. But using the mnemonic approach and then developing it too because he wasn't able to initially memorize 50 or 60 or 70 digits. That was an ability that was developed with a lot of practice, right?

Anders Ericsson: Right. I think what is really interesting about him was that he kind of discovered like now being provided here with this immediate feedback of this task, he could then sort of explore different options and find that some of them worked and others didn't.

So he was able to come up with a system that he was able actually to describe to a running buddy. But that running buddy actually had to sort of almost relearn the skills because it was more like the structure of the skill could be communicated but when it comes to really being able to do the memory task, you actually have to develop by yourself these rapid encoding processes.

Roger Dooley: Probably like somebody explaining to you on paper how to change gears in a car versus actually being able to do it smoothly in real life.

Anders Ericsson: Exactly. I think that skill component I think is something that a lot of people in education have underestimated the role here of really building up representations that allow you to perform various skills at a very competent level.

Ep #110: The Surprising Way to Become a Real Expert

Roger Dooley: What is homeostasis and why does it prevent us from stretching our abilities?

Anders Ericsson: Well the body is designed to actually allow all the cells to kind of have a very comfortable environment. So if you run up the stairs, you're now going to actually push the system. Some of the cells are no longer going to basically have all the oxygen and all the glucose and energy. The body will then kind of respond to try to provide that environment for these cells when they actually are metabolizing more energy than they would if you're resting.

The point is that if you're going to get the body to change, it seems like you have to push yourself beyond that kind of limit where the body can actually adjust. So if you just go out jogging, you're not going to really push the limits. But if you run now as fast as you can for a minute and then walk and then run as fast as you can, people call that interval training.

In that case, you're really pushing now the limits of what you can do. In that case, genes in your DNA will actually be activated. Then lead to processes that lead to growth of capillaries. That will even if you train for years lead to remodeling of the brain to allow it to pump more blood effectively to allow you to be able to run at a faster rate as a long distance runner.

Roger Dooley: So from a learning standpoint, what are the implications?

Ep #110: The Surprising Way to Become a Real Expert

Anders Ericsson: That if you're going to change, and I think that's kind of the key to our idea, that if you want to improve that in essence means that you need to do something that you can't do comfortably.

The way you get to that new point is actually by stretching yourself to that point. By doing that, the body will now kind of reorganize itself to allow you to get to that point. If you want to keep improving, well then you have to set your goals even higher to allow basically the body now to keep adapting to allow you to eventually, gradually reach a very high level of performance.

Roger Dooley: We mentioned language learning. I think that's something that probably many of our listeners would like to be able to do. I know millions and millions of people worldwide are engaged in learning language at any given time. There are companies that have turned into a multi-hundred-million-dollar industry. It's just a hugely important skill but it is not easy for adults to do.

I spoke Spanish, not particularly fluently, but a little bit some years ago. But after decades with no practice, I've lost a lot of vocabulary and grammar. For me, the challenge is listening and understanding in real time. If I'm listening to a newscast, I might be able to understand it but then I'll hit a phrase that stumps me and that sends my brain off trying to interpret it. Basically at that point, I lose synchronization with the newscast. I figure out what the newscaster said belatedly after a few seconds but by that time, I've pretty much lost track of what's going on.

Ep #110: The Surprising Way to Become a Real Expert

Now if I keep listening to newscasts, probably that same thing is going to keep occurring. It's probably not the most effective way to learn the language. What are some ways of language learning that would be more effective?

Anders Ericsson:

My feeling is, and I often use an example from tennis, but I think that would apply here to language just as well. So let's assume here that you're playing doubles with your friends and you miss a backhand volley. Well basically the game would just continue. Let's assume that you get a very similar situation say half an hour later, you're not any more likely here to be able to be successful here with this backhand volley.

So this is a little bit the way when you're actually allowing life to determine what it is that you're engaging in. So if you're listening on a radio program, you can't really determine exactly what kinds of vocabulary will be produced.

But if we move you now to a situation where you have a private tennis coach, that tennis coach can now basically take a look here at your backhand volley attempts and then allow you to be prepared and then you can do the correct fundamentals. Then eventually, he can make it more difficult. Eventually, he can force you to run up to the net and do your backhand volley. Eventually, he'll be able to mix it in as you're playing with him.

That process now of focusing in on improving one aspect, that is kind of the core of what we basically describe as deliberate practice. So identifying

Ep #110: The Surprising Way to Become a Real Expert

something that you can change through a particular training activity. That's why the teacher comes in because the teacher would be able to tell you exactly what it is that you're really having problems with and then come up with a training activity that would allow you now to gradually improve this in a way that integrates and allows you to kind of keep adding on and improving other aspects of your language performance.

Roger Dooley:

Anders, one takeaway that I got from the book is that our brains are in a "use it or lose it" situation. You point out the very hopeful aspect that we've got plasticity in our brains, that we can grow areas.

You cite the pretty remarkable experience that's been often quoted in other literature too of London cab drivers who spend years developing what they call "the knowledge." Which is learning by memorization a network of, I don't know, 25,000+ streets and landmarks. Basically, they have to know the city practically flawlessly.

Those cab drivers who successful complete the test actually grew their hippocampi. That's the good news. That really suggests that we can all change, we can learn and we can change our brains. But the downside is when those cabbies retired, they started to lose that. So to me, that was a pretty big takeaway. Do you see that happening on sort of an ongoing basis where people are both growing areas of their brain and perhaps losing some of those connections if they're not using them?

Ep #110: The Surprising Way to Become a Real Expert

Anders Ericsson: I would say that when I've met people who are really excellent, they seem to basically, are committed here to kind of stretching themselves continuously. I sometimes encounter people in professions who somehow are more interested in reducing the effort level and just more or less keep doing the things the way they always have as opposed to constantly looking for challenges and things that would allow you to actually keep improving.

I would say that if you stop with a practice, and we even actually looked at musicians, pianists, and those pianists who actually stopped spending time dedicated to try to improve—we're not talking now about the time that they spent playing with their students and stuff like that—but that dedicated time that they spent by themselves to keep holding their skills at a very high level and maybe even trying to do something that they've never done before.

I think that is what I argue is the most important things with the people that I admire is that they actually keep evaluating what they're doing constantly trying to anticipate things that could happen but might not happen very frequently. So when they do happen, they're actually prepared to deal with these new situations.

Roger Dooley: So even if you've already achieved a level of mastery, one of the keys is to keep striving to maintain and even improve that level.

Ep #110: The Surprising Way to Become a Real Expert

Anders Ericsson: That's what seems to be sort of the secret of being a really expert performer is that commitment to lifelong development.

Roger Dooley: Most of our listeners are involved in business of some kind, whether it's large business or more entrepreneurial operations. You spent some time in your book talking about how these lessons can be applied in a business context.

You cite the Navy's Top Gun school for fighter pilot training as an example that reversed kind of a poor training situation by combining expert training, close simulation of real combat, very detailed feedback, and then continued practice, just to keep that sort of circular process going until their skills were at a higher level. How can businesses use these approaches to do a better job of training their people?

Anders Ericsson: I believe, and we worked a little bit in medicine where I guess the challenge I think in business is to find situations where you can get objective feedback here about what is the correct way of handling a situation. Very often when you're in the middle of a situation, you don't really know. You're trying to do your best, not unlike a doctor that encounters a patient. So they're trying to diagnose that patient but it may take several months before the final diagnosis for that patient is available.

If you really want to learn, then it seems to be more effective here to deal with old patients so you can now actually see what information was available when they were first encountered. Then you can

Ep #110: The Surprising Way to Become a Real Expert

actually see whether you could actually diagnose what is the correct diagnosis that was evident several months later.

I think in business the more that one would be able to kind of collect examples of situations where the feedback about what was correct may be available weeks later. Then actually give sort of like a library of cases that would allow somebody to confront and make a decision for a case and not having to wait now several weeks and forget about what they were thinking about. But would then be able to get immediate feedback about that particular case because you're actually now referring to a case that occurred earlier.

Roger Dooley:

Okay, I think you're saying, in the book you talk about radiologists who make diagnoses and then probably never hear whether they were correct, whether they missed something, whether they correctly diagnosed a potential cancer, or even provided a false positive. If they do get feedback, then it's months later and it's pretty much long forgotten.

But what you're saying is a training simulation in that kind of case might be to give learning radiologists, a radiologist-in-training, x-rays to view where the outcomes were already known and then provide them immediate feedback on their evaluation, if they found something, if they didn't find something. Tell them whether they were correct or if they were incorrect, at least as far as the final outcome was concerned. You could immediately give them that feedback, right?

Ep #110: The Surprising Way to Become a Real Expert

Anders Ericsson: Right. I believe actually that even practicing radiologists would benefit from that type of practice. What is nice about it is that if you have a big enough library and you find that you actually missed paying attention to something that ended up being critical, you maybe could have ten or fifteen cases that were related that you would now develop that skill of being able now to interpret that particular feature in a reliable way so when you encounter it during normal practice, you won't make a similar mistake.

Roger Dooley: Yeah, there have been a lot of great studies with radiologists. One of them put a little tiny gorilla in the corner of an x-ray as apparently part of the x-ray and only about 10 percent of the radiologists spotted this little gorilla. Presumably a play on the original invisible gorilla movie where people were so closely observing a basketball going back and forth they didn't see a person in a gorilla suit walk across the screen.

Another one that I found really fascinating was when there were photos of a patient, when the patient was identified with a photo, the radiologists were more likely to find a hard-to-spot issue on an x-ray. In other words, humanizing it made that more important.

Let's jump over to your current school for a second, Anders. Florida State is a great university. My son graduated from there and I've been on the campus many times. One of the things they're known for to probably most of the people in the United States is their football team which has won multiple national championships, despite getting a much later start

Ep #110: The Surprising Way to Become a Real Expert

than the traditional football powers. I think they played their first football game in 1947 where schools like Michigan went back to the mid-1800s.

So I have to ask, has the athletic department contacted you or have they employed your techniques as part of their program? I mean you're a great resource for learning.

Anders Ericsson: Well actually I've been talking to a couple—I've never talked to the head coach. But somebody felt that it was sort...

Roger Dooley: I think only God gets to talk to the head coach at Florida State.

Anders Ericsson: Well you know, I was invited to meet with the coaches of the Philadelphia Eagles so I actually noticed that some of these more international organizations have been more interested.

My sense is that here at FSU coaches are maybe not really looking for advice from scientists. So until I can actually prove to them that I can offer something that they aren't already offering, I found that coaches like to keep the power to themselves. I think they're basically held responsible at a personal level, so I can see why they might be reluctant here to seek too much advice externally.

Roger Dooley: Right. I think they've got a lot on their plate too. Although I think the popularity of *Moneyball* a few years ago probably showed that a scientific approach to sports can sometimes have a pretty significant effect in some sports teams.

Ep #110: The Surprising Way to Become a Real Expert

Now, I spend a lot of time in the neuromarketing space. One of the techniques they use, or marketing firms use, is facial coding, decoding micro expressions. Apparently a number of pro sports teams are using facial coding to evaluate potential recruits. Looking at how they respond to situations and just seeing if they presumably have the right psychology or mental strength or whatever to deal with situations and be part of their team environment.

There's probably the close-to-home factor too, Anders, it's like if you're just the guy in the psych department across campus, you're nothing special. Where if you were called into a California school, then you would be the outside expert.

Anders Ericsson: Also I think once you have a successful team, you probably are less likely here to ask for ways here to change.

Roger Dooley: Don't mess with success, yeah. If they were last place, then you might be getting a phone call. While we're on higher ed, higher ed is a really interesting situation. Colleges and universities are getting incredibly expensive and particularly private institutions, but even great public institutions like FSU, a lot costlier than they used to be.

Instruction techniques probably haven't changed much for a century or two by and large. If you were given a blank slate to redesign university, what would it look like?

Ep #110: The Surprising Way to Become a Real Expert

Anders Ericsson: I think what I would like to do is to provide more opportunities for students to develop deeper skills. I believe that one of the most beneficial things that you can provide students with is to get an in-depth experience where they actually get to appoint where they can actually feel how their able to control.

So if you're going to be in science, you actually get that ability of designing experiments and doing them. So you can now actually start thinking about basically how you need to think in order to become a scientist. But that experience of reaching a high level in some domain I think is very valuable.

I think that can translate now when you're leaving college and maybe deciding on a different career. just having that knowledge about how you achieved a high level in one domain I think provides a lot of insights into how you would be able to achieve a similarly high level in some other domain.

Roger Dooley: Hey, to wrap up, Anders, I'm sure your research and teaching keep you busy but have you tried personally to develop any new skills using your techniques?

Anders Ericsson: I think this is interesting. I found out pretty early on in my career that in order to be as good as I would like to be, I'm a pretty competitive person, I guess, at least some people tell me that I am. That it would take too much time away from what I was getting more and more interested in, is to find those similarities across different domains. So I'm not claiming here to be an expert on expertise but at

Ep #110: The Surprising Way to Become a Real Expert

least that's kind of the domain where I wanted to do my best.

I find that it's a way for me to combine actually hobbies with my research that I can pretty much learn about how some people acquired high levels of expertise in areas that some people would think more as hobbies. It's sort of finding a way here of coordinating all your efforts is something that I found very helpful to me to try to be the best that I could be.

Roger Dooley: Great. Well let me remind our listeners, we're speaking with Anders Ericsson, coauthor of *Peak: Secrets from the New Science of Expertise*. Anders, how can our listeners find you and your content online?

Anders Ericsson: Basically what I tell people, I don't have any cards to hand out anymore. Google me or maybe look at Google Scholar for some of my most recent papers. You will also find that at the top, Anders Ericsson, is my university web address where I have some materials. I also think that anybody who would want to learn about some of these ideas should at least take a look at our new book that I've written with Robert Pool called *Peak*.

Roger Dooley: We will link to both your page at FSU and the book page on the show notes page at rogerdooley.com/podcast and we'll have a text version of our conversation there as well. Anders, thanks so much for being on the show.

Anders Ericsson: I really enjoyed talking to you, Roger.

Ep #110: The Surprising Way to Become a Real Expert

Thank you for joining me for this episode of *The Brainfluence Podcast*. To continue the discussion and to find your own path to brainy success, please visit us at RogerDooley.com.