



The ENGINEERING CAREER COACH PODCAST SESSION #19

How to Work Smarter as an Engineer by Utilizing Both Sides of Your Brain

Show notes at: engineeringcareercoach.com/brain

Anthony's Upfront Intro: You are listening to *The Engineering Career Coach Podcast* with Anthony Fasano session #19. Most engineers only use the left half of their brain. In this session engineer and author Stu Walesh will give us tips for how to activate the right or creative side of the brain so that we become full-brained engineers. Lets do it!

Episode Intro: Welcome to *The Engineering Career Coach Podcast*, where it's all about helping real engineers to overcome real challenges and get real results. And now for your host, who is on a mission to inspire as many engineers as possible, professional engineer and certified career coach, Anthony Fasano.

Hello everyone. This is Anthony Fasano, your engineering career coach and I want to welcome you to the TECC podcast session #19. I have an awesome show for you today and a very interesting topic of innovation, creativity, using your right brain as an engineer, which I think unfortunately a lot of engineers don't do because we weren't ever really taught how to do it. So we're going to jump into that in a minute. I have one announcement to make very briefly.

Many of you know that I run a community for engineers called *The Institute for Engineering Career Development*, known as the *IECD* and we put on a meet-up, which is kind of a mini conference, a few weeks ago down in Austin, Texas. We had about fifty younger engineers from around the country come together. The speakers consisted of engineering leaders and let me just tell you, these leaders just laid everything on the line. They gave us so much information. We took tours of the city. We had tons of fun. It was just a great weekend overall.

It was so much fun that we're going to do another one and we're now going to do two a year. So first thing I want to tell you is if you didn't come but you want to read about it - read about some of the information that was given out, some of the quotes by the engineering leaders and the keynote speaker - you can check out my website at engineeringcareercoach.com/austin, and that's kind of a recap of the event.

Those of you out there that might be interested in coming to the next one, it will be in September - the twenty-fifth, twenty-sixth, twenty-seventh, Thursday, Friday, Saturday. Thursday will be a special Mastermind session and the opening party and then you'll have the Friday and Saturday sessions and tours and fun parties. Just wanted to kind of give you a heads up to save the date. The last

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event sold out and the Mastermind session sold out pretty quickly. So if you're an engineer in Southern California and you're interested or just IECDeers out there that want to come, get this on the calendar or you can send me an email with any questions - afasano@powerfulpurpose.com. We already have the event website live, which is iecdfallmeetup.com. Alright so enough of that, let's get into the show.

I'm going to introduce our guest for today, who is Stu Welsh. The reason that I contacted Stu initially was because I heard about a new book that he's working on which sounds extremely interesting to me. It's titled ***Introduction to Creativity and Innovation for Engineers***. So when I saw that I immediately thought I have to have Stu on the Podcast. We cover a lot of different topics but one thing to really listen for in this interview is when he talks about mind maps. He gives an example of how a mind map was used on a project and ever since I interviewed Stu I've been using mind maps and it's been phenomenal for me. In my business, in personal endeavors - it's been awesome. So a big thanks to Stu for that. So with that let me give Stu a formal introduction and we'll jump right into the interview. I hope you enjoy it.

Stu Welsh, PhD, PE is an independent consultant providing management, engineering, education training and marketing services. Prior to beginning his consultancy he worked in the public, private, academic sectors serving as a Project Engineer and Manager, Department Head, Discipline Manager, Marketer, Legal Expert, Professor and Dean of an engineering college. Welsh's technical specialty is Water Resources Engineering. He's authored or co-authored six books and many engineering and education publications and presentations. His most recent book is ***Engineering Your Future: The Professional Practice of Engineering*** and he's working on ***Introduction to Creativity and Innovation for Engineers***. So obviously an accomplished guest we have here today but most importantly is the topic that he's going to discuss. So let's get right into it.

Coaching Segment:

Anthony: Alright, now it's time for our coaching segment and as you just heard me introduce, I have a guest with me today, Stu Welsh from helpingyouengineeryourfuture.com and I'm excited to have Stu on the show here. And we're going to talk a little bit about brainpower today and working smarter.

So welcome aboard Stu and before we get into the whole topic of working smarter why don't you tell our audience a little bit about your background and kind of what made you decide to start doing training and speaking for engineers on some of these interesting topics that you focus on.

Stu: Well first of all Anthony thank you for the opportunity to participate. I appreciate this chance to share some ideas with you. Your question has sort of two parts to it. One is how did I get into

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education and training and then second you made some reference to my interest in brain science and neuroscience as it relates to engineers.

I need to go back to my childhood. I had a family home across the highway from Lake Michigan up in Northern Wisconsin and I vividly remember my mother taking me across the highway and I'd go down by the beach and there was a creek there that flowed in the lake. I love the water and I've built levees and dams and reservoirs and so on. When I got to college I found out that I could study Civil Engineering. I could get paid for continuing to play with the water, which is what I did.

I spent about the first twenty years of my career in what I think was some pretty sophisticated water resource engineering work and then I sort of tired of that and I thought what would I like to do next. And I started to drift into the professional practice aspects of engineering, the nontechnical or sometimes called the soft side aspects, things like project management and communication and marketing and ethics and so on. That led me then to start doing some part time education and training via face-to-face classes with the American Society of Civil Engineers. Then in the year 2000 ASCE and I experimented with the first ASCE webinar and that got me into the webinar business. So that sort of answers the first part of your question, how did I get into education and training?

But let's turn then to the second part, how can we make better use of our brains? About five years ago I wandered into an art center in my community and on a whim I took one session of graphite drawing, pencil drawing and that's the first art class I'd had since perhaps the third grade and I just enjoyed it, and then I moved into colored pencil drawing. But in the process I came across a very interesting book by Betty Edwards, titled *Drawing on the Right Side of the Brain*. It's a two-purpose book. One purpose is to teach us the fundamentals of drawing, but the second purpose is to let us understand the power on the right side of our brain.

So that motivated me to study what we've been learning about our brain in the last couple of decades. Then I did some writing and speaking about that. My focus came to how can we use neuroscience discoveries to help engineers be more creative and innovative. I really have enjoyed this subject. That kind of, I hope that answers your question Anthony.

Anthony: Yeah, absolutely. I mean I think that it's very, very interesting to me. I'm someone who does similar things as you, helping engineers with their nontechnical skills, so to speak. I think doing that requires - and we're going to get into this a little bit - requires new habits, requires new ways of thinking, requires you to draw from the non-analytical side of your brain, which is why I think this is so interesting. And the reason that I asked you to come on Stu is that I think if engineers want to be well rounded they need to obviously utilize both sides of their brain.

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So we're going to get into this a little bit more now but tell me about, when you say working smarter - Stu has a webinar or seminar that he does and that's the reason I contacted him was because I saw the title and the description, which is called ***Working Smarter: Using Brain Basics to Enhance Individual and Organizational Performance***. What I'm interested in the whole idea of working smarter Stu, can you elaborate on that a little bit?

Stu: Yes. I'm thinking of three things when I consider how engineers can work even smarter than they already do. One is to be more effective. The second is to be more efficient. And the third is to be more innovative. And if I could, let me elaborate, at least on the first two, the effective versus efficient.

The best way for me to distinguish between the two is to share an experience I had when I was an employee of an engineering firm. I was a department head and every Friday afternoon the office manager and I would get together and we'd quickly prepare a report on the status of the waste water projects in our office and then we would send that report to another office. We were very efficient. John and I carried out that task in maybe fifteen minutes. One Friday I asked John, I said, "Why are we doing this?" I thought he knew, but he didn't know and I certainly didn't know why we were doing it. So I said, "John, let's not send the report this week and see if anybody notices." He reluctantly went along with me. We didn't send it. Nobody noticed and we stopped doing it.

The point of my story is we were very efficient at putting together the report but it was totally ineffective. We were efficiently doing something that didn't need doing. I think many of us engineers are under so much pressure and operating so much on automatic pilot that we don't stop to think about how effective we are. We focus on being more and more efficient. So one of my hopes in this workshop is to give people a chance to think about their effectiveness.

Anthony: That's very interesting Stu and I agree with you a hundred percent. I see a lot of engineers these days very stressed out, a lot of project deadlines and a lot of work. I think sometimes what I try to do is stop and take a look at everything you're working on and think about that effectiveness, apply the 80/20 rule, see if the stuff you're working on is most important, I guess - as you explained - is it effective regardless oh how efficient you're doing it. I think that's a challenge with engineers because we try to do everything as efficiently as possible but we also try to do everything.

So we may be doing everything efficiently but twenty percent of those tasks may not need to be done and I think you gave a good example of that with what you just said. Now Stu, you mentioned being effective and efficient and you also mentioned innovation. Talk to our listeners a little bit more about innovation because I think that that's so important if you want to be that well-rounded engineer who can really achieve your goals.

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Stu: Yes Anthony. I was thinking if we had this interview, if you were asking me questions ten years ago I doubt that I would have mentioned innovation. I might have thought about it but said, "Well engineers are sort of naturally innovative. It doesn't need special attention," however I don't feel that way anymore for a variety of reasons. Some of your listeners may have read one or more of Daniel Pink's books. He's one of these futurists out there who do some speaking and writing. One of the things he said is society has gone through the agricultural age, the industrial age and now we think we're in the knowledge age, and then he takes issue with that. He said we may be in the knowledge age but we're moving into what he calls the conceptual age.

And of course the root word of conceptual is conceive, to be involved in the creation of something completely new. What he's saying is the knowledge age is great, however the knowledge age is based primarily on learning how to do some admittedly very sophisticated processes but nevertheless, bright, well-educated people around the globe can do those things. He calls them algorithmic tasks.

What I'm thinking of in engineering is we have every year a huge number of young people graduating from engineering and engineering type courses and programs around the globe, especially in India and China. Those young people are going to be increasingly capable of doing the kind of sophisticated work we engineers in the US have been doing and they're going to be able to do it at much less cost and therefore the challenge to us is to do higher value work.

That's what I think of when I consider Pink's idea of going into the conceptual age. That is if we Americans and other individuals, professionals in well developed countries are going to continue to be successful, we're going to be able, we're going to have to be able to be much more creative and innovative than we are right now. That's why I'm focusing more and more on this, helping engineers be more innovative.

Anthony: That's great Stu. I agree with you there as well. I'm a big fan of Seth Godin. I read his blog a lot and he talks a lot about the idea of innovation and the fact that we have to be innovative to be different, that you have to provide value because there's always going to be someone out there that can do the job cheaper in the engineering world, however if you want to be relevant, if you want to be a go-to engineer you need to be someone who delivers value in a way that's innovative.

I think one of the biggest challenges that we have to focus on as engineers moving forward, is to try to combine these things we talked about and be effective, be efficient and be innovative. I know sometimes people think that when you become very efficient and when you do things and follow processes it's hard to be innovative but I think that there's ways of doing both. You have to just work hard to try to combine them so that you can maintain quality and be innovative. Do you agree?

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Stu: Absolutely. We can be effective and in those things where we are effective obviously want to be efficient. But at the same time we need to be open to completely new ways of doing what we're doing. That's a challenge but you know we've got the brightest people in engineering. I used to work at a university and I would see the profiles of the incoming students summarized by college. I would see the profiles of our engineering students. I would see the profiles of the business students, the arts and science students, the nursing students and so on. The most promising group was always the engineering students. To me, helping engineers be even more creative and innovative is a matter of practicing good stewardship with the kind of talented individuals that enter our field in the first place.

Anthony: That's interesting. So Stu, would you say that this class that you took on drawing, I guess it had a big effect on you I would say?

Stu: Yes, and as with many things that happen in life Anthony, when I took that first class in my mind it had absolutely nothing to do with my professional work. It was simply a whim, a diversion. But when I picked up Betty Edwards book, *Drawing on the Right Side of the Brain* as a result of taking by then many classes, I started to see the connection between what she was talking about, the whole brain approach, and how we could be even more effective in our professional practice. So you find as you go through life you think it's largely a planned endeavor but more often than not it's serendipity.

Anthony: Okay great. I just want everyone to know that Stu has mentioned a bunch of different resources; you can access all of these resources in our show notes. We're going to have links in the show notes and to access the show notes for this show you can visit engineeringcareercoach.com/brain and it will take you to the show notes and there'll be links to the books that Stu has described and also anything else that we discuss today in the form of websites or references. Alright Stu, in the description for your seminar on working smarter you talk about eight tools known as working smarter tools. Can you pick a few of them and share them with our listeners here?

Stu: Yes. Let me start with a tool that's called borrowing brilliance. Borrowing brilliance - this would be an example incidentally of trying to think broadly, more broadly when faced with something that appears to be a routine. A good example of borrowing brilliance would be the automobile assembly line.

I did some research, how did Henry Ford come up with the idea of the automobile assembly line? About a hundred years ago some of the Ford personnel visited the stockyards in Chicago and they noticed how the carcasses were processed. And what they saw is the beef or pork or hog carcasses were hung on hooks and the hooks were on a conveyor belt and the conveyor belt carried these carcasses passed workers at individual stations and at each station a worker was responsible for disassembling part of the carcass. And they said, "What if we reversed that? What if we had an

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evolving automobile on a moving assembly line along which we had workers at fixed stations and each worker or set of workers was responsible for assembling an evolving automobile?" And that's what they did. To me that's a perfect example of looking at a situation, trying to take a very broad, fresh perspective and coming up with some brilliant ideas and that's why that's called borrowing brilliance.

Incidentally, that expression, borrowing brilliance is not original with me, in fact it's the name of a book that describes that whole tool. There's another example of that incidentally that I think many of us are probably aware of and that's Gutenberg's invention of the printing press. We like to say he invented the printing press, well not exactly. What he invented was the reusable type printing press. And what he did is he borrowed from others. He borrowed forging, metal forging from the Romans. He borrowed from the Chinese wood block printing, which had been around for centuries by then. He borrowed the press, the press mechanism from the wine industry.

So what are the tools that's available to us, if we can get outside of our silos, is to try to look very broad whenever faced with a problem. If for example we're a bridge designer and we look at the requirements for a particular bridge site, clearly we would stop to think about previous projects we did in similar situations. Nothing wrong with that but it would be wonderful if we could also look broadly at other possibilities and that would be acting in the spirit of this borrowing brilliance tool. So that's one example I have. Maybe you have some questions or comments about that tool?

Anthony: Yeah no, I think that that's great. I mean I think that idea kind of pushes us towards evaluating what we're doing and improving it and I think that that's one of the things that everyone doesn't do enough, including engineers.

I think that we get wrapped up in moving as fast as we can and if we took a couple hours one day to stop and evaluate some of our processes we could make them better and save us a lot of time in the long run. The problem is most people don't see the value in that. They don't want to lose the hours.

Stu: That's right. We don't want to take the time to think, which sounds foolish but we do it all the time.

Anthony: Right. Yeah I know. I do it myself. I mean there's times when I'm doing a task and I realize that if I were able to just capture what I was doing and give it to my assistant I wouldn't have to do it every week but instead I continue to do it. So I think we all need to think about that. How about another tool Stu?

Stu: Another tool that I use often is called mind mapping, mind mapping. I use this tool because my experience and my reading and research suggest that it's a great way to engage both hemispheres of

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the brain. To engage that left hemisphere with its very logical orientation and that right hemisphere with its very sort of intuitive, holistic, creative characteristics. It's a very simple process. I've done it individually and I've done it with groups. What we do is we take out a piece of paper. Let's say it's a group. We take out maybe a couple sheets of newsprint. We put it on the wall and somewhere in the center we draw an oval and we write in there whatever issue, problem, opportunity, challenge we're thinking about. I recall doing this once with a group and what we wrote in the center was 'pond problem'. This was a group of four people got together to talk about a problem with a pond in a residential area. And then we sort of go into brainstorming mode and whatever anybody thinks they mention it. So somebody might say water quality. So we would write 'water quality' on another oval and we'd draw an arrow to water quality from the first item. I recall that particular instance with the pond problem within twenty-five minutes we filled up, in that case, an entire white board. At the end of that twenty-five minute process what we found out is we didn't have a pond problem, we had five pond problems and each of them was fairly well defined and from then on the group could focus on solutions to what now were the pond problems. The idea of doing this in a brainstorming mode but a nonlinear mode makes it a very powerful tool. As I mentioned, I use it often.

Anthony: That's interesting. Yeah, I think mind mapping is great. I use it a lot myself. In fact we just reconfigured the engineeringcareercoach.com website. I had a whole mind map to try to figure out how it would be easier to put the resources in easier locations for the engineers and our listeners to get them. There are some, I don't have them on me right now but there are some free websites where you can actually create a mind map and I'll put those websites into the show notes, which maybe I'll put a photo up of a mind map as well. You'll be able to access those show notes again at engineeringcareercoach.com/brain.

Alright Stu, so one other point I want to ask you about and then we'll keep Stu with us and we'll get into our career changing tip. You talk about replacing bad habits with good ones in your seminar description and I saw that throughout your site in some spots. And this is a big thing for me that I try to focus on a lot - improving myself by putting new habits into place and I also try to help listeners and engineers that I work with. I know how important it is to try to replace a bad habit with a good one but I'd like you to talk a little bit about that and maybe some strategies for doing that because ultimately at the end of the day, in my opinion, if you're going to improve yourself, better yourself you're going to need to replace habits.

Stu: Absolutely. One of the things that I learned recently is how much we are dominated, how much our actions and our words are dominated by habits. I have found estimates that say fifty percent or more of what we say and do is habitual. So we need to recognize that habits are in control. We also need to recognize that habits are driven by our subconscious mind and therefore we don't recognize what's happening. Our conscious mind we think is in control of everything but it's not and in fact it could be that our subconscious mind is controlling much more than our conscious mind.

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We like to think we're in charge and we say, "Oh I can do two things at once. I can chew gum and I can compose an email at the same time." The fact of the matter is chewing gum is the subconscious mind and we don't have to think about it. It takes care of that complicated process of chewing gum while our conscious mind is focusing on writing that email. If we have a habit that we recognize but we don't like it's possible to change it. It's not easy but it's possible to change it. What we need to, we need to understand that a habit will manifest itself in response to a cue.

So for example, if I feel thirsty that's the cue. My routine, my usual habitual routine might be to reach for a soft drink and when I do that my reward is it tastes good, I feel good. However if I think about it I might conclude that's a bad habit because I really don't need all that sugar. The way to change that is to be aware the next time that cue comes about but have a different response. So next time I feel thirsty my response is going to be to reach for a glass of ice water and my reward is the water tastes pretty good and this is better for me. If I consistently do that, say for a month, it's highly likely that that habit that I originally considered bad (drinking the soft drink) will now be replaced by a habit that I now consider good, drinking water.

Let's take a professional example. Many of us get in situations where we have an opportunity to possibly connect with a new client. So the cue is coming face to face with a potential client however our response to that, our habitual response to that is to start talking about us and our organization. The result of that - we don't seem to be making very productive contacts. So we say, "I'm going to change that habit." The next time I experience that cue of being face to face with a potential client I'm going to instead go into an empathetic, question-asking mode. I'm going to ask them about them and I'm going to see if I get a reward for that, if I have a better understanding of them, if we connect.

If I find that the first time I try that it works fairly good, I'm going to consistently do that for say a month and I can assure you that if you do that consistently for a month you will be able to replace what you considered a bad habit with a good habit. The whole key there Anthony is to recognize that habits are controlled by the subconscious mind and look for that cue, change the routine and see if you experienced a reward. Does that make sense?

Anthony: It makes sense. It totally makes sense to me and I think one of the biggest challenges for people trying to implement new habits is exactly not doing what you said and doing it for a month. I think the critical aspect of creating a new habit is you have to do it routinely for a certain period of time to create that new habitual action.

For those of you out there that want to improve anything in your career or your life, like Stu said, it's important that you understand what habit you want to replace it with, what action you want to replace it with but it's also important that you do it for a long period of time. Because if you just do it for a

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couple days and you said, "Oh, I'm doing good," and you skip it for a day or two, you're going to completely lose it and that's why people that say, "Oh I'm going to start going to the gym and working out," they go for a week and it's great and they don't go for one week for whatever reason it might be and they lose it.

Stu: Yes. The neuroscientists tell us that what we're doing with replacing a bad habit with a good habit is we're reconnecting many neurons within our brains. The fact of the matter is that takes a while but once the new connections are there they're there, they're for real.

Anthony: Exactly. Exactly. Alright, thanks for that Stu and what we're going to do now is that I will list all the items, that reference that we mentioned in those show notes. You'll be able to get them. What I'm going to do now is we're going to jump in to our career changing tip and I'm going to have Stu stay with us and he's actually going to give us our tip for today.

Anthony's Career Changing Tip:

Anthony: Alright, now it's time for our career changing tip and the point of this segment of the show is very simple. You take the time to listen to my podcasts and I want to give you something that you can take at the end of every show, implement into your career and life immediately and see some kind of change, whatever it may be.

So what I'd like to ask Stu to do today for us is - we talked a lot about the brain and how powerful it is and creating new habits and being innovative - Stu can you give our listeners - could be one thing, could be a couple things - that they can do, basic things that they can try to do on a daily basis to really see some kind of change in their career or their life based on this whole idea of working smarter?

Stu: Yes Anthony, let me try to do that. I would underline your comment about the brain. To me our brain is currently the most magnificent mechanism in the universe, the most amazing assembly and by learning how it works we can practice even better stewardship with whatever gifts we have. I like to think that all of us are striving for some combination of success and significance. By success I mean things like the income we earn and the titles we have and the professional accomplishments, the sort of things that are personal. They're about us. They're sort of about stuff. But I think all of us are also are seeking significance, having some impact beyond us, some positive influence on the world around us, sort of legacy kind of things.

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I suspect that the mixture of success and significance that each of us shoots for varies widely among your audience. We each have to work that out for ourselves. But what is it that helps us achieve whatever combination of success and significance we like, that we're striving for? I'd like to put it in the context of four Cs and I would like to share the **four Cs** with your audience.

The first C that I think of is **competence**. We need to maintain our competence. We need to develop the habit of always being open to learning no matter where we are in our career.

The second C that I think is very important is **communication** and one of the most important communication habits is to listen before we react, before we respond.

The third C, that is really crucial, is **conscience** - the idea of being able to do what's right and earn the trust of others and that requires the habits of honesty and integrity, that is telling the truth, keeping our word.

The last C gets us back to the innovation, creativity theme that we've touched on over our time together today and that's **creativity**. Because, as I said earlier, the world is changing very rapidly and we see the rise of competent engineers around the world and therefore those of us that want to lead need to develop that whole-brain habit, need to be more creative and innovative.

I hope that's of some help to your listeners Anthony.

Anthony: That's great Stu. So if you're out there listening you just heard the four Cs from Stu. You can try to implement those four Cs into your career, into your life and see some change and utilize that brainpower that we have. It's something that's so untapped by so many people and hopefully by listening to this podcast today you'll start to think real seriously about how you can be more effective, more efficient and more innovative in everything that you do.

So with that Stu, I want to thank you so much for spending some time with us and I'm going to mention real quick Stu's website because Stu does have a website that has a lot of information for engineers of all ages that can benefit from, which is helpingyouengineeryourfuture.com. And Stu's also working on a book. Do you have the name of the new book yet Stu?

Stu: Yes, the working title is ***Introduction to Creativity and Innovation for Engineers***.

Anthony: So that's something we can all look forward to as well. So with that, Stu thank you so much for coming on. We really appreciate it.

Stu: Thank you Anthony and best wishes to you and your listeners.



Anthony's Closing Remarks: Alright everyone, I hope you enjoyed the show. Be sure to visit engineeringcareercoach.com/brain to get all the show notes from the show here today and all of the resources that we listed and I will see you on the next session of *The Engineering Career Coach* podcast.

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