18. Transcript of the video 'Creativity and Paradigms'[*]

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Abstract

A transcript of the 1.5 hr workshop on Creativity and Paradigms by Dr Tom Kraft.

Creativity and Paradigms

Tom Kraft, Ph.D.

In this course, what we try to do is to develop leaders. That's our main end, to give you leadership skills so that you can advance faster. These are skills that you will have probably picked up in the work place, through experience, through exposure, but we want to just condense that so that you are ready to go out with that.

So we have an expert here. He has a background in mechanical engineering. And in fact he's a Ph.D. in mathematics from Rice. He has an MBA too. So he is not new to many of you, for my regular students who do come to this course, he's Tom. But some others I see here have not been here before. Last time he came here he talked to us about etiquette and giving presentations. This times he's going to talk about creativity and he's actually been creative. And he is the director of NewVent technology Ventures at Rice Alliance at the Jones School here at Rice. So welcome, Tom. I'll hand it over to you.

Thank you very much. What I love about students and research is that they're always consistent, they always fill up the back row, so. One of the things we'll come back and harp at is that your creativity will be least likely to emerge when you're comfortable. Because when you're comfortable your brain slows down and says, 'you don't have to worry about that much, you got it made, everything is comfortable, you're rear end's in the right place, your books are on the floor, you got your water here, you don't really have to do anything for an hour' and you really start turning off a lot of your cognitive processes. Now I don't want you to do that. So I get you up and I get you uncomfortable so you start to think more creative, or you're more open to that. So we'll come back to that, and I'll get you more uncomfortable.

So we're going to talk about innovation, creativity and paradigm. And she mentioned images, and we're going to create an image of a wheel with 5 spokes, which make up this ongoing activity we call creativity and innovation, but before we do that, let's assume that how we start, if we get a task, a problem, a need, sometime, and the people who gave you this, presumably, your boss or whoever that might be, expected some sort of creativity and innovation out of you. And what do you think that means? What do you think they expect is in that creativity? Somebody says I want a really crazy answer, what do you think they're looking for? What are some of the things that they would, you would assume, that they would put in this context of creativity? How would they know that you were creative? What's in this thing? What's this word mean?

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It's an idea, a new point of view.

A new point of view? Okay.

Thought.

Pardon?

These are all pieces of it. Somehow we need to get a little bit more systematic in this. This is the left brain working first and we'll talk a little in the right brain so it comes in and joins you and we're going to say that there is 5 spokes.

This is arbitrary, but that's the nice thing about being a lecturer as my friend, Dr. Wells will know is that you can be arbitrary and say something has two parts that's fine. It has 5 parts, okay. I'm telling you it has got 5 spokes and this is the image I want you to think of. And each spoke, or these elements that go into creativity are as written: challenge, autonomy, purpose, mastery, and tools. And if you notice, in autonomy it says 'free from paradigms.' What do you expect that means? Do you have any thoughts? Yes.

Think outside the box.

Outside the box. Paradigms define all the rules but paradigms by which you do things. Everything, from the time you get up in the morning, when you get dressed, when you eat breakfast, and drive to work, and sit down at your desk and answer your e-mail and you finally get to work and do things. Paradigms define all those things that you typically do. And you know if you're doing the same thing you did yesterday, then you get the same result you got yesterday, so they work in the interest of creativity because they have been built because they want the results to come out they expect they should. We'll go into that, that's kind of interesting.

They become the barriers to creativity in almost every case. So it's interesting to see how do we deal with all of these paradigms that tell us how to live, what to do, how to think, what's expected of us, and so we'll march forward from that.

What's not included in that list? You know some things that I didn't mention about, I mention challenge and autonomy and mastery and purpose and tools, what didn't I mention? Why do you suppose none of these things ended up in the sense of on the list of what goes into creativity and innovation? Got some thoughts why these aren't in there?

*Because I guess you can say that some of the most well compensated people are least creative.*That certainly be it. That's a good point. Do we have any other thoughts?

Well, sometimes if you think imaginatively, what you're thinking about might not work. You know, your solution may not solve your problem but it gets you there.

What is that?

But as a result, because you have ideas that don't work, you may not be recognized for nonworking ideas.

Why else have I not included any of these? Did you have it?

(Inaudible)

They what? They would not enforce creativity? Okay, we're going to be a little stronger in a minute. Yes m'aam.

Well, I'm thinking that that's not what drives people wanting to be creative and innovative. Not necessarily a high salary or bonus. People like to be creative for other reasons.

Well I'm going to tell you something stronger than that. Not only is it not productive in the sense of creativity, it is counter productive. Now you may not believe that, but there have been studies done at universities in different parts of the world. From India to the Orient to the United States and consistently if you're being driven by a bonus or a raise, you're less productive. You're not less productive, you're less creative. Because you tend to change the whole nature of your focus and there's been a number of interesting experiments, and we'll talk about some of these in a minute and a little bit later in the talk where your focused on acquiring that particular reward and that begins to engage you in the paradigm or the kinds of things that block you from being really open to doing creative ideas. Consistently, all of these things are counterproductive to creativity and what they do address is productivity. If you want somebody to make more units or widgets per hour, you give them more money, you may be able to get them to work faster and harder, but you can't get them to be more creative, innovative with bonuses and salary increases and things that make them more comfortable. It is exactly the opposite and it's been shown consistently.

One of the interesting references that I want you to note, fortunately you have this in front of you, you can keep it. Daniel Pink has summarized most of the studies that have been around the world that actually prove this point. And if you're in a leadership position and you have people of whom you expect creativity, you ought to read this book. It's very interesting and it's going to discuss some of the points that I'll be discussing but the philosophy is the same. For instance, in productivity those things are fine. If you're interested in creativity, you've got the wrong tools in your hand. We'll talk about what tools we need.

Okay, the challenge. One of the first spokes on this wheel that we talked about the word challenge. What's in challenge? What is challenge all about? What does it mean? Somebody mentioned some of the things earlier when we were talking about what goes into creativity, but there needs to be present, challenge. It is an essential element for creative process to take place. Challenge means that there's typically problem solving, there's an activity where others have failed and you're trying to achieve whatever that might be. There's a, relationship aren't known that you're trying to uncover, there's mysteries that need to be explained. There's functions that need defining. It's a difficult job to do. For some reason. The challenge needs to be there or you don't seem to crank out these creative resources. But what it isn't. These are the things that are not included in challenge. So, these are parts of your job that do nothing to make you creative. You may have a very great filing system, I think that's an oxymoron. That does not play with this thing at all. So these are the things, your job has too many of these things in it, it's not surprising that you're not terribly involved in creativity.

Let me catch up here. Okay, autonomy. This was the second spoke we talked about and we're going to put in some more time about that. But if we have challenge first, then the next thing we have is autonomy. What is autonomy all about? One of the great stories that leads us to understand autonomy, some of you who are a little bit older, a little bit older, I'm looking at Dr. Wells might remember Locke Skunk Works? Locke had a problem in a big, aircraft design company and there were a whole bunch of airplanes that liked doing things and they had a lot of trouble getting them to sign, they were wanting to fly 5 times the speed of sound, and they haven't flown as fast as the speed of sound yet, they wanted to fly at 100,000 feet and no one had gone over 60,000 feet. They wanted to do this, and they wanted to do that and they had all these requirements of what they wanted to do for a half for fuel and twice the efficiency, whatever that meant, and finally a fellow named Kelley said, "I'll do all that" and they said 'great.' And he said, "but I'll do it my way," and they said, 'what's your way?' He said, "give me a building, give me what I need in the building, take every rule book you have at Locke Corporation and burn it, and locked the doors and none of you come into my office, my laboratory will have these planes up for you. I want none of your rules, none of your corporate policies, procedures. I don't want to know what you expect, I got the problem, we'll fix it." And they said, "are you kidding me?" and he said, "no." So they built the building, I don't know how big it was, 30,000 square feet? Gave him the tools he need to produce a SR-51, the U2 plane that you know about came out of Locke came out of this Skunk work. They had no titles that had no policies they had no personnel rules they got together and they played and they developed work and they did things and they build these things in less than a year. Amazing story of innovation and creativity when you take away the rules by which you have done things for so many years. It's a great, great story if you ever look at it. It's very fun.

So the whole idea is don't give me the rules to solve the problem after you give me the problem because it won't be creative anymore. If you give me a problem, don't tell me what answer you expect, that's a, you're soliciting something. What I want you to give me in the problem is get the hell out of my way, let me do it, get out of my way and let me do it, that's what the researcher wants to do, if creativity is expected and innovation. So autonomy means the absence of paradigms or rules that tell you how to do what you're supposed to be doing to find an answer for you. And if you're following what you're supposed to be doing by paradigm, you're going to get the same answer you got yesterday, it's not going to be creative. So that's what the point is with that.

The stories that you're reading, we're going to come back to them a little later because I think they are very powerful. Understanding how these paradigms disrupt your whole thinking process and moving towards creativity will be what we're chipping away at.

Okay, the third spoke that we had on there is purpose. This surprised me a little bit, but not a lot. In the research that they have done of people who were creative if there wasn't some meaningful value to

what the objective or challenge was, he didn't really get a creative answer. That people's creative juices and innovation tended to flow if they really believe that the purpose of the whole item, whatever the challenge or need or problem was, has some real fundamental merit for mankind. I was a little surprised but it's true in like 97% of the studies that they've done. Amazing correlation how important it is that you as a researcher buy into the value proposition of why this work needs to be done. If you don't even know why it needs to be done, the odds that it'll be creative are very slim. Which means if you assign somebody a task, you need to sell the value proposition to them. Why does this need to be done? What's the purpose of it? Because if they buy into the purpose, you have a higher chance of getting a creative answer out from them.

Mastery, this could be a little bit surprising to some people but I find it very interesting and the whole idea is, if you feel what you're doing is going to enable you to say to yourself 'I can do something other people can't do' or 'I can do something significantly better' you're actually kind of learning the higher level skill. You're learning a mastery level skill or something that is not going to typically be present in all your peers. And you kind of like the idea that after this problem you're attacking, you're going to be a little bit more able to do some certain things. You'll have better skills than you had before, you feel some personal growth. We call it mastery and if you don't feel there's a chance of that, you're going to turn on a little less of your creative juices. So we'll find a way when you're assigning work or receiving work to understand this particular aspect of it because I think it's important if you want to really be a creative work, which means you really do value what you can learn and that you really want to get better at it, all in time. Everybody does at every level. That's not just some eye level. People who are creative want to get something out of it.

Okay, and the fifth spoke on this is tools. And we're going to expand on it a bit for most or rest of the time talking about tools after we get to paradigms a little bit. But the whole idea is you need to find the tools that are appropriate and you need to understand that creativity requires that everybody find their tools and these are going to be interesting to talk about. We hope that in sharing some of these tools with you, that you'll have a chance to practice it and say, 'actually, it worked a little bit.' It'll show you how these things get characterized because I think it's kind of interesting how pervasive this is.

So these are the two things that we're going to explain. And putting a little more effort into autonomy, paradigms, and tools maybe, what kind of traits do we use to define creativity?

Okay, the challenge before us then is certainly is create and implement creative or innovative solutions to problems and understand paradigms through autonomy and how do we make tools effective. So these are the things that we're kind of looking for almost as a subchallenge. And we're trying to understand that one of the things about paradigms which is a lack of autonomy is that the people who created them and the reason they were created is that they want you to think a particular way. They want you to behave in a particular way. They want you to create a result that they already know and appreciate, so it's amazing how these paradigms are all created out of some value system that says, 'we want you to behave like this, do this, and produce this result.' So it's very strange if they expect you to be creative and yet they overlay a bunch of paradigms on you on how to behave and we'll talk a little bit about understanding these because it'll help you understand how to get out from under some of these things.

Okay, this is just a short little thing. We're kind of talking about paradigms. Paradigms are typically made up of a whole bunch of rules and rules are generally created, and we'll go through this a little bit, out of some value system. Value system can be citizens, any group of people, political, military, academic, whatever, who have some common value. They create rules and these rules get reflected in paradigms which define the way we do things. And with these common expectations that we follow, paradigm, this is the result. So we have piles and piles of these. If we start listing the ones that affect you all, it would take us the whole rest of the day, and we'd still be listing paradigms and effect on how you do what you do. And at the other side, let's say we have no goals, no expectations, no paradigms at all, so somehow, that's very brave, but we have to balance. This time doesn't really work by itself, so if we have nothing but rules, expectations and all of this, you can expect to see very little, if any, innovation. Stagnation, you can call this the North Korean approach to managers, and there's very little room for expression or innovation in this whole system. If you want that, you go buy it from a neighboring country or something, but you don't have any of it at all. On the other hand, if you have no rules, no expectation, no paradigms, we call this the 'Woodstock Manager' which is pretty much chaos and nothing results, so of course, you can't have a system

with no rule, you have to have a little bit to balance for safety and health reasons. Things that are of value. So I've overstated this a little bit, but in reality, I certainly appreciate that there needs to be a balance or you're going to have either chaos or complete stagnation.

Okay, I'm going to make a value proposition to you about the value of lecture. For the time that we have remaining that I'm saying that your awareness of creativity can be expanded greatly today by defining how you understand the world and rules, how you understand me and paradigms, shedding a little bit of light on the dark side of paradigms so you can appreciate what you're working out of, embracing some creativity tools and accepting a leadership role, which what we mentioned early in the introduction, your leadership role in a creative world, so we're, we'll jump into that.

Okay, we start this with rules. Rules sort of begin everything. And this sounds very boring, rule and you have both this. Well, we are people of rules. We live in a world of rules, everybody loves rules, rules coming at us from every direction all the time, they're pervasive, definitely personally social behavioral play work, you didn't have rules, how would you have sporting events how would you have playoff games and so on. If you get in a stink in football, the rules are so pervasive it's incredible. And the paradigms as well. So, rules originate in some responsible group with common or shared values. They all want to achieve some goal and maybe it's fuzzy like a common good, whatever that means, or it's something that some value that the group hopefully wants to achieve, so they create some rules, and there's some interesting things about this. So this becomes a value based, these sets of rules and they generally as soon as we're a common good. Well nobody has every defined common good in such a way that is common for everybody. For the people who created the rules, it's a common goal. So people outside that group or may or may not bite, but nonetheless, those rules came out. And one of the things with those rules came out of, how do we enforce the rules? And what happens when people don't follow the rules. So when you're playing with rules, you got to think about what's the compliance issue and what's the enforcement issue, so these things do come up. We certainly accept rules because they're very, very efficient. They define all the things like traffic, when we have no rules. Believe it or not hwy59 would be even worse than it is now, even with rules, it's only a little bit better than chaos, but boundaries caters to unicorns and badgers these are all paradigms where the purpose is to get you to think a certain thing.

You see someone in a police uniform, you think of a whole set that occurs to you, and I do. And that's the paradigm that the policeman represents has been built on a system of rules; they want you to think a certain way when you see that. Those who created these rules and this pertains to everything in someway or another. Certainly rules simplify our decisions in many ways, they make our life easier. Cooking rules, procedures, standard operating procedure, and they teach us how to play games better, sporting events. But one of the problems is, even in the playing field, very often, rules are written to even the playing field. And the question is, is this a good idea? And think about that a little bit. They say, oh this is unfair because of this and this, so we got to make rules so it's not unfair anymore. Somehow fairness being some issue of common good, somebody's impression fairness.

So what do you think of this even playing field? Is this a good objective? Or might an uneven playing field be a source of creativity and innovation. So if we really have a level playing field, we'd all be robots, and we'd all do the exactly the same thing at a prescribed, on cue behave alike, dress alike. Somebody's who is 6 ft 8 will have to get surgery to remove some inches from his height because it's not fair, and he can get to the basket earlier and he can drop the basket in there, and we have to jump. That's not fair. We need to have an even playing field. Or he needs to have heavier shoes or something. That's the kind of mentality that comes into rules and paradigms even playing field, make it fair.

And academically, we want everybody to have the average grade. What? So, here we have a common engine driving things, let's even the playing field, when in fact, this may be the one of the engines of innovation and creativity. Any thoughts or comments? Would you agree, disagree?

Well I would think that if you have an uneven playing field people would, who are taller for example, would make people who are shorter, like me, work harder, as you said, to jump higher, to work harder to attain goals.

Or they may find a new game where height doesn't do it.

Or they might be more creative in attempting to find it.

So you're saying, okay, let's play a game of chess, and I can challenge you there. But yes, it does drive engines. And it's not just the physical; it's even mental enough. Yes, sir.

I mean, isn't there a risk then if you don't have enough? And this is definitely devil's advocate, if you don't have an even playing field, the individuals who are creative will then reap the rewards, make money, become stagnant, but be at the point where they no longer need to be creative, and potentially ruin things because they are the instrument.

We have to have a sense of fairness to build trust in a system to even compete at all.

To even compete at all?

To want to compete, if you're not, if you feel that the system is fundamentally unfair, then why would you even want to participate?

Well, are you talking about an asymptote we can't reach?

Well, I'm talking about how everything, an uneven playing field looks good if you're at the top.

Well, if there's a simple answer, we wouldn't be having this discussion. But I want to change, I want you to think about how much energy is put into, you name the playing field, and I'm asking you just like he says, this unevenness creates one of the engines that draws creativity in a lot of ways. For example, we used to have a little vacant lot down the street, my kids would grow up, and it was an odd shaped triangular lot, the street turned this way, and it was triangular and inconvenient. So the kids, nobody bought the lot to build a house, so the kids played baseball there. Well, triangles is a bad place to play baseball, and then the kids in our neighborhood were every size and shape from little roly poly Gordo to tall skinny Joe and older young guy everything. I think baseball worked out because they adjusted the rules so it was fair in some sense to them, meaning that they wanted to play. You know, the little guys got 5 strikes, the big guys got only 1 strike and they were out, so they made up for it. So they still had fun. So that was sort of a common goal. But, I'm not against the common good or evening some aspect of the playing field, I'm just raising the question to you that as an objective some of these paradigms that have been written guiding your behavior perhaps were written in a way to discourage people being innovative creative because everybody, yes sir.

It just seems to me like the stakes of the game kind of matter. I mean, if you like, if the police are deciding.

At that end of the game, sure. If I hold a gun to your head and said. You'd say, of course. But in general, unless you have some high power. You know consequence of something you got to hold it through a series of cerebral reactions to give the survival which is very different.

I just raise the question because it's something you need to think about in terms of the objective that your working under and I think that, I think it's intriguing. You may not, but I think often, I see that as an engine of change that's useful. We all reject rules and paradigms and that's because they don't seem to address the ideals that you hold close to you. They don't serve these values, and whatever it is, they're not working. You may agree with the value, but they're not serving them. Or you may agree with the value but whatever it is, one of things we've mentioned, is that these rules were created and whoever created rules defined a rule of consequences for you to follow. If you don't follow the speed limit, you get a ticket and you have to pay a fine. Well all of these rules have some consequences and so you have been made aware of these in a variety of ways but these get grouped into paradigms, these rules, and it's very interesting because paradigms are designed to never change and you'd be surprised. If you look at the ways these rules are put together, they don't want them to change. If they thought they were going to change, they wouldn't have created them in the first place. They create these and they don't typically build in a way to modify them or change them as needed. You get laws, you create a law and that law may be Obama Health Care, I don't care what the law is, you have a speeding law, you don't have a sentence in that law that says, 'and if you want to change it, this is the way you do it.' There is no vehicle of change intrinsic in the law or paradigm itself, it's generally another paradigm created out of if you want to change this paradigm what trouble you have to go through to make it possible because these paradigms once they get created in one way or another, change is not desirable or they would have created it in the first place. They value what comes out of the paradigm and they begin to get themselves invested in this paradigm and so the paradigm itself becomes of value.

Paradigm, you see it in academia all the time. You have the whole academia having procedure and all

of a sudden, you say, why do we have textbooks, why do we have classes, what's the point of these things? Do we want to open education resources? Why, why not? What's, what are we doing as educators? Are we just pushing a textbook, pushing it through a textbook so you can pass the test at the end? I don't know, I don't know. Lots of paradigms you live with you have to ask how do we change it, well the system doesn't like for you to change these things because they've been built by people who have now invested heavily in this and don't like it. We don't like it. Yes, sir.

Couldn't you guys mention want to put in more paradigms that we work under that you see as stifling for creativity?

I mean, you get grades. You take tests, and you pay $150 for a textbook and once you learn that you get so many credits. Is that a mirror of what you've learned, what are we all about? 10 year? Can you be in a paradigm for 10 years? If you're in it, it's a wonderful paradigm, but it's so elusive and the education process. And if you get into the damn discussion, you have trouble figuring out what are the goals, what's the new need, what are the objectives and everybody acts out at that part of the discussion. But pretend there's a paradigm that in itself as become of value other than the guys that created it in the first place because I'm not sure if anybody today knows what the values are that created the first day in ten years.

In the third world, they know.

Does that make sense? He's lived with it all too. He's administered all of these things that are difficult things. So the paradigm...

I am probably the only person you know, who at a major research university brought forward a motion to eliminate tenure. It did not take.

There are trouble makers who tend to be creative and innovative and God bless them, we're delighted for that. Thank you, Bob for being that, and for having the courage to be that in a world that doesn't necessarily appreciate resistance in that.

Okay, let's talk about the light side. There are good things about paradigms, we give them a bad wrap, they certainly tell us how they want us to respond to century input. If you see this, you respond a certain way. If you see this, you're supposed to respond a certain way. And you're bombarded with this advertising all the time, and you know, if you see a really cool guy smoking a cigarette or worse, then won't you think, 'that's a really cool guy, so what he's doing must be really cool' so you get a Marbolo man or horse. And all the paradigms you're trying to shake how you respond to visual and other kinds of inputs. They try to explain what you sense unfortunately and they're vehicles, a lot of things in that in merchandising is that they create some images and if you want to identify with that image, you want to identify everything in that image, so you see a scene in movies that have a great actor or actress and you really like what they're doing, and to balance out coca-cola on the table, that term makes coca cola a part of that whole scene, just like the cigarette and the Marbolo man. Same kind of issue comes up, but the paradigms are designed to help us explain what we sense, fortunately sometimes, and to predict what's going to happen. If you touch a hot skillet, you're going to burn your finger, all these kinds of things. Probabilities, weather reports, are paradigms kind of funny sometimes, but they try to explain probabilities. I love these people who try to explain 'probability of rain is 80%' then I occasionally laugh 5 people what that means to you, and you're going to hear people tend to provide really weird answers. The probability of rain of 80% is 80% of your body gets wet, 80% of the time of the day, 80% of the time that you do this you'll get it, what's your sense? But they don't have any idea at all. But everybody uses it and they sort of like it, it gives them some sense of what's going to happen; expectations, you know, and the paradigm defines success. Awards, academy awards, they give awards to what they think are the great actors and these are the actors that follow whatever the paradigm that Hollywood puts forth in the screen actors guild. We reward students for behaving more like faculty and we reward all kinds of people in ways different from Miss America. So assisting rewards, you don't get too far away from the paradigm, they let you, so we'll keep going with the reward gen, so it could be a high level work of any kind, a world class reward and all of this is designed to keep the paradigm strong and enforced. Teaching and training we use paradigms all the time and they are very helpful. If we didn't have paradigms it'd be really hard for us to think about what we're going to teach.

The dark side of paradigms. We're going to have to kick up the speed here. One of the things about the dark side is these paradigms are typically created in the first place to separate people. Separate people

from those who follow the rules that make up the paradigm from those who don't. so somehow paradigms intrinsically tend to separate or isolate people one from the other, which is kind of interesting and they limit what you see and hear through sensory inputs because they want you to react a certain way. And these things are hard to stop. And changing paradigms, if you introduce something really new and creative in your research, which you hopefully will, then you will be involved with people changing. And you may have a great innovative and a very creative idea, and it dies when you try to implement because you didn't understand the paradigms that need to change in order to accept this thing that you were doing, whether it's turbine engines in cars going against the internal combustion engine, there's just unlimited resistance built into prevailing paradigms that resist new paradigms. So you fix these things that are you huge problems, and you need to understand the paradigms that are there and the value behind them so you can learn ways to correct them, and we'll talk about those tools.

The reason that you need to change paradigm, and these are the obvious things, they don't take a lot of understanding, they're really pretty clear. The paradigm isn't creating the desired result, there's some necessity for a new paradigm, certainly there's works, our building predict is not impressive, water shortages, we've run into situations where there's a great need for some new paradigm, how to understand this, how to make this better, there's new health facts that come out that everybody needs that needs dietetic research. We see a lot of things things. Nutrition behavior are the bottom of all things, as you all probably know, and there are facts that changing a paradigm is very tough, very tough. And we deal with all the time, global changes, hunger border issues which we all live with. Deadlines, somebody talked about the fear of a gun to your head and these are all things that we have to get creative, how do we solve these things? These are all cause for change, calls for change, and playing is unlikely to change.

People like to experiment with other paradigms, it's often interesting to see how that works and we talk about sci-fi pulls. One of things that's important to note is that one of the great tools of change we'll talk about very briefly in a minute is science fiction. If you want to roll that play, bringing about effective change. You come up with a creative idea, you can't get it implemented, but you plan into it, sometimes you move into the world of scifi and gaming. And find a way to create demand and a pull in reality.

Okay, who participates outside their hospital? There's a 5 year old kid learning about paradigms. As long as he eats and has time to play, he's fine. So, and actually, paradigms are tough changes, changes are tough, creativity coming out of older people because they are so invested in so many paradigms, so it's really tough. So the change comes with the young, and those will not be those will want changes for some personal objective. And some of these are crazy. And I think fundamentally there's a lot of changes. I mean, personally, I don't think I agree, I think there are some people are tools, and give themselves the permission to be creative more than the fact that they are.

One of the things that you need to appreciate is the sense of resistance or the shape of resistance to changes and paradigms. We mentioned people have awards and different kinds of things that keep you following the paradigms that they have. And one of the big resistances are fear of decision, people will raise questions of fear about whatever it is they propose. Well, you know this, that's scary if you don't know this. We've leveled the playing field, we've talked about the, it's safer, this idea that the W knows better than the W don't know, and you don't want to change, you're going to get a lot of that. Changing just tends to confuse things and ways are confusing are people once say, let's just not change anything at all. So these are the type of resistance that you see. You can see that.

The slogan is really great. So the slogan is that people will have about, about why your process isn't really going to work in the shape of resistance. Oh it's great, fools rush in where angels fear to tread. I made a list of these one time and I got to 30 and I was amazed and how many times I've heard these things from people who are resisting somethings which I thought was creative and good. He who hasn't taken his is loss, what the hell is that about? Opportunity only knocks once, and funny thing is. If at first you don't succeed, try, try again. People are into slogans often times to protect a value system that they have, that they think they have in certain paradigms. It's kind of funny how these things come out. You don't change horses midstream, you're into these politics, and courts, and you go into sociology.

A quick view about the process of bringing new ideas out and trying to get them implemented, which is almost completely impossible. So, how do we do that? We study paradigms because they tell us how we're

supposed to see things and if we wish to create a new paradigm we need to understand how to sell it. So these 6 steps that we need to understand these things and how do we in these case, and how do we design these going forward.

Okay. Coming back to you. We've talked about how it works and somehow this is really important. If you're really, really comfortable, you're not going to be really creative, so, if there's, I've seen creative offices and it wouldn't look like much of an office to you, they're very, have a lot of weird things going on. The thing is, the more accustomed your sensory system is to your environment, the more it turns off its ability to see other things from the rest of your senses. My friend Dr. Wells used to have in his building where he was in charge of this particular biomedical/bioscience facility. They had white boards all down the hall where he stopped and discussed an idea that you wrote down with a friend while you're still talking. It was kind of interesting, so this innovation began to happen it just facilitated that. It didn't lead to anything idea or like sacred protected thing. So it was facilitating nurturing and communicating ideas as they merge. I guess that's the process. And you consider that successful sir?

Well, yes, absolutely.

And I walk down the hall, and I was just intrigued by each white board in terms of how much stuff was on there and how much to stimulate that. And standing in the hall is hardly a comfort zone. I don't recall any chairs in the damn hall nor do was it a hall that comfortable to stand in. I mean, the lighting was okay, but there was, the floor was pretty hard, and yet stuff came out, so that's an important thing. Sometimes you have to artificially make yourself more uncomfortable since you have such a cushion. You often assign projects to engineers, we used to say you can't use electricity as a solution in your design. And they go, 'what?!' and I always have electric motors. And they bitch for a while but they say okay, we'll make a game of it. I say, you're talented, I want you to find a solution where you can't use electricity and they respond to that. And it's because we might make things where batteries are dangerous, we have gas problem, whatever, so, it's amazing even if we artificially tie your hand behind your back or limit the tools that you can use, creativity will jump up as we took you out of your routine of all the comfortable tools for you to use, you can use this kind of device. And immediately, the reaction is, what are you talking about? That's what I use in what I do. You say, that's right, and you go, ooh, ooh, you're now where we want you. You're in your zone of uncomfort, all of your senses picked up a sensitivity level, much more than they were before and it's amazing all of the designs that we did. We did find solutions. Sometimes we found it useful because we found it impressive because sometimes we did use this or that and it's because the challenge was there and the discomfort was there. So don't feel way comfortable tool.

Okay.

These are the 10 tools that we are going to talk about. Some these are a bit quicker than others, we have to be done by 3:45, right. And we all turn into pumpkins, right?

Okay, rule number 1. Learn how to feel foolish. She spoke earlier that one of the problems that she had in being creative was a fear of being foolish. And it's very common and proposing preposterous, you get people who kind of look at you and say, "are you okay?" or "You want to keep your job?" so of course there is a natural fear and these things are kind of interesting, you'll see. And some of things that we talka bout this tool is you have to work at how not to feel foolish. One of the things is that you never criticize, you don't criticze anything. And if you work with other people, somebody says something totally foolish, you say, 'that's really intereting, that's okay, it is interesting' and don't put a value on other ideas or even your own. Don't think 'oh.' Take the value thing out of everything you think and say in your early phases, particularly.

Challenge assumptions. All the time, always challenge assumptions. This is an essential part of that. Some of the great, there are so many great examples its hard to say, I give you one because you are all in the biology space, a certain oil company was having secondary recovery and they would pump fluid into the ground to push oil out to facilitate the recovery. So they would have something with a certain viscosity, and it was greater than the oil so they pushed and the oil to come out, and they take out the wells, all they were getting was a fluid they pumped down without catching any oil. What's the viscosity change? What happened? And so it turns out there were some organisms there that were ingesting your material and turned the viscosity so that it was less than the oil a bit like passing the oil. They said, 'no, that

couldn't be because we cultured that in our best lab and found things.' And I happened to be involved in this so I can tell you. So we said, well, maybe they labs didn't find it. They said, 'what do you mean the labs didn't find it? We have the best culturing labs in the world.' And how did you do that? 'well, we did this and that, and we used this agar and this and this' and so you raise the question, 'did you assume anything?' 'no?' 'did you assume they formed colonies?' "uh.. yeah.' "What if they don't form colonies?" "Well, I guess we will see then, but we don't think that happened." I said, "What if could find one and take a picture of one with a micrograph, would you believe?" and they said, "yeah" and we did it, and they went away, embarrassed, because it happened to be a plant pathogen too. And, not a colony forming organism. Interesting. Assumption was colonies form, they don't always. Does that surprise anybody? You kind of think they form colonies because that's what you do in textbooks when you study these things. Make sense, Bob? I know Bob has worked with many of these things. Some of the other things that are interesting, in challenging assumptions, you have to challenge every assumption. You're going to use the tool, 'why are you using that tool?' 'we're going to culture the organism' 'why areyou culturing the organism?' 'well, so we can see it.' So challenge, challenge, challenge. Some of the other things that come up that are interesting is the reverse assumptions. This is a fun one to have. I think some projects, this is in a large national organization. The membership was going to hell in a basket. They weren't getting new members, and they were sitting around trying to have a meeting, thinking of ways to increase membership, and so somebody came in and said, 'why don't you assume membership is a problem because you have too many members? And you need to provide ways to reduce people's interest in this organization' and they go 'what?' but they tried it, but in the process they found out where the real values were in the organization, they were able to implement them, and they did increase their membership by 25% by the following year. So just reversing the assumption was they were able to do that, and that was kind of a fun example.

Pretend there's no problem. Well, classically, how many of you are math minor or majors? Good, we got a question, thank you. We need more. One of the classic questions is, you got a theorem you got to prove, what do you do? You assume it's not true, then try to find a classical contradiction. A classic example of a position to prove, assume it's not true. And thankfully, it's a faster way to prove it than if the assumption were true. It's an easy way if you can find a discontinuity very quickly with that process so that works really well. Some of the other things that are interesting, let's see.

Let's pretend there's no problem first. Reverse the viewpoint. Somebody asked this question one time they were talking about how much they were going to watch the Wimbleton, and there's 64 teams and I'm trying to figure out how much television time and how many games I have to watch to reduce it down to 32 teams, and each one plays this and these winners play this and somebody said, 'what are you trying to do?' he said, 'figure out the number of matches' He said, 'that's not the way I would do it. Why don't you look at it another way? Why don't you assume out of the 64 people, how many losers there's going to be, 63. What does it take to lose? 1 match. After 63 losses, you have a winner, right? Duh! 63 matches, that's how many matches there are. And you have to sit there and work it all out. Binary combination and do that. Change the rules. A typical example of a fun to change rule. Let's see what example that I have pointed out here. There was one time we tried to talk about, we wanted to pick up a pill out of a bottle, a random order of pills, any size, any shape. It could be a nitroglycerin and tiny or it can be a tablet of Vitamin C or something like that. It could be independent of any kind of stat charge capacity it could hold, or static charge characteristics. I want to pick a point that I always do that. And so you say, well, that's easy, all you do is you pour them all out, shake them, and try to get them all lined up and take one off the end. And you say, what if you can't have any mechanical motion? 'aw, man, you keep taking away my good tools and tying my hands' and 'that's right, that's exactly right.' 'we want to tie your hands so your brain starts working' and we ended up building a system which can actually pick these things up, positive or negative air pressure, independent of the size, independent. So that's very interesting. So changing the rules by which you're trying to solve the problem to do this is very helpful.

Let me see. I'm going to roast common sense. We talked about the slogans that people throw up against you sometimes it's funny. Take these slogans, it's like, 'you reap whatever you sow' or 'patience is a virtue.' You take some of these things, sit around, and roast and see how these things fall. Sometimes these things can be stimulating. We used to make a list of slogans that we've heard that concerned us and we roast them

great thought, and it really does tend to open up your thinking quite a lot. One of the classic things is how so and so solves, but whatever that she picked Rick Perry or Tim Tebow, it doesn't matter, pick anybody who's not in a play, because you think of them in terms of skills and thoughts, and sometimes they give you ideas if you sit around and joke about how would so and so solve this problem. You find that not only enlightening, but you get some great ideas. How would Walt Disney solve this problem? How would Steven Jobs handle this, solve this problem? And you find the truth is very useful.

Tool 2. This is simple. How you take risks. In the process of your creative design there's always risk. And I'm not ever going to say that there's no risk because the issue with these things is simply to understand what's the worst case and I think I have one suggestion here that we have found works quite a lot. And once you've looked at what the risks is, what the consequences of the risk are, and what the probability is, then you can okay, you can deal with it. I find that if you give it a name, give that problem a name, what the bad risk is, call that Joe or Greta, give it a name, you'll understand what it's all about. It's easier to move on with your process and make a decision. You can isolate that easier than have a pervasive risk or overshadows what you're doing. Giving it a name, you can walk away from it. I'll come back to Fred, we'll work on him later. That may sound funny to you, but that's often true in cancer therapy. You'll see a lot of practitioners that'll say, 'give that damn cancer a name. call it whatever you want to. Get mad at it, have a relationship with it, walk away from it at times, don't think about it sometimes, but don't make it an amorphous cloud that sits over you all the time' and it's true of engineering and design too, in process. If there's a problem, tag it, and it'll be easier to set aside for another day. Make sense?

Okay, that's an easy one. Give yourself permission to be creative. If you have trouble giving yourself permission to be creative, you didn't sound like you were creative. I don't think there's a right brain left brain issue here at all. Everybody is a little bit right brain, a little bit left brain, depending on how you culture and nourish these parts of your left and right hemisphere. I think everybody can be creative. It has nothing to do with your education. I can assure you of that. I go to these events in Houston inventions meeting, you ever go to those? They have showcase every July, they'll have a hundred members show their inventions, more of these people not only didn't go to secondary education, they didn't finish high school and some of their ideas are terrifically creative because they were working with a problem, they figure 'damn, this is hard to do, what if I did it this way? Oh, that's easier' a new tool or a new way to structure something makes their job easier, and they did it. They just did it. That's right, think of that, and they said, well, does it make what I did easier? I like that, that's good. So, but you got to give yourself permission to do that. You can't think if this doesn't work and I have an idea, I'm just going to weenie out, I don't know anything about this stuff, I got to go talk to the dean or something. Anybody can have a great idea. Anybody at all. And most of these things come, most of these inventions that come to the patent office are not terribly necessarily the sort of people, so it's worth it.

So the first thing that you need to do is to give yourself permission, and then it's an interesting thing, you've all heard these stories I'm sure, and there's been 2 or 3 of the online TV where a class was told first day of class, and it said, that I don't care what the subject was, that says, you were selected because showed the indication that you have the most potential capability of development of any of the kids in school, so this class was put together as an exceptional combination of those that had the capacity to really to development. And another class, they sent nothing to do to compare them to the ones that were great in the beginning did twice as well. Every time, any subject. And this is a question of giving yourself permission to do that. If I tell you, you got everything you need to be really damn good, you can be the best at what you do, every indication of such, of nothing of the sort. And you say, oh, okay, and you reform. And so creativity is the same way. Let yourself do it. You don't have to go through the game of having someone tell you because you can do that, and you can do that. So just give yourself tell yourself that.

Learn to use all of your senses all the time. All the time. And cultivate. Meditation is a great way. I mean, think about meditation and the path to do this. And the way to do this is to learn how to turn off the world of external stimulation that is trying to program you into a set of paradigms that you may not want to participate in or so you may, but you shouldn't have to. So learn to turn off that part of your world. Learn the intuition, your hunches, your ideas coming to play, because I think they'll serve you well. And that's important to to do in a couple of ways.

Getting through the clutter is really tough stuff, but more important than that, you cannot trust your intuition and hunch. And people are shown in many, many studies, some of your hunches and intuition is much better than the results of the nice having thought process. You tend to be right very quickly and you have some great fast responses that are very good if you even listen to that intuition. Not necessarily followed all the time, but listen to your. And you may find some that you like or may not like. You usually sort of make up your mind in the first few seconds and 15 seconds and then you'll have nothing to prove that you're wrong. Then a few more seconds and you get, oh you turned out better than I thought. You don't say that, but you think that. Or you turned out the other way around, so we see this over and over again that UH did a study where they went into a class and they had observers go in, education observers, and do a middle school class and watch the ongoing activity for 1 minute. 1 minute left, and they each went back and wrote up how the class functions over, and then you had other people come in for 15 minutes and an hour, and the ones that were there for a min got all the right information, right off the bat. And they did and it's how they, and they were feeding their instincts and intuition, right brain left brain, it's a nice analytical process that got the whole stall and they said this class works, good bad, amazing. This is your intuition. It's a very real part of your capacity to perform because this builds on, the sum total of your whole life's experience is good and bad, more than you're even consciously aware of. So it's worth listening to. So I'd say cultivate that process.

Sense of wonder. How many of you have heard of Rachel Carson? You don't get to vote. That's too bad. Rachel Carson wrote a book in the 60s called *Silent Spring* in which she pointed out all the evils of government chemicals and society, but she wrote a book that was, or a story for Lady's Home Journal and it was called *A Sense of Wonder* and it ran in there. It was awesome. An awesome story about how she raised her grandsons in teaching him to have a sense of wonder. And the things she did that were just magnificent to open up his senses. They'd walk around a pathway, and they'd sit down on the grass in a circle 3 ft in diameter, and then they'd tried to find 10 things they've never seen before. Living things and it's amazing if you didn't know, it's amazing, whether it be a flower that was too small to see or some bug walking along, and it was true in every piece of life. To feed that sense of wonder such that you didn't have to get into a whole bunch of names, of what the plant name was, what type of plant it was to nourish the senses. To see and hear and touch things all the time that you normally just walk right over. So that's the whole point. So I know my son one time read the book and then he took his family on a vacation a couple weeks later he had kids this big and he said, we're going to follow the Rachel Carson vacation. They said, 'what's that?" and he said, we're just going to work on our sense of wondering why things happen. And they go, "oh man what are you talking about dad." So anyways, he's driving along and they see one shoe on a hook. How often do you see that? Quite often. So they stopped and they all stand around and they told stories of what happened to the other shoe. And they had great responses. Always opening up the imagination and senses. If you let yourself to do that, does that sound crazy? Some of your are smiling, and you have kids that have seen one shoe and you know what that is. That Rachel Carson book has been reprinted by the way, and it's called *A Sense of Wonder*.

Okay, rule number 4. Accept that creativity is not a logical process. Part of this is really get to the things that we talked about between the hunches and the intuitions and the feelings is that the logic that guards the intuition is not rational because it denies your whole problem solving capability. So if you're looking for an equation to solve your problem, that isn't rational. Use your hunches, use your intuition. Let it all play out. I think these things should be pretty obvious to you to do that. Some of the things that is interesting in this is that there's a lot of concerns about your initial reaction to a problem. Sometimes you'll get a very quick reaction just like blink and some of these thing we talk about, you walk into class or you meet someone very quickly, you get an opinion very quickly. It turns out that there have been a lot of studies about that initial opinion and then after a while, maybe hours or so, you form another opinion, and a couple days later, then you form a final opinion. And it's interesting to see these things. The middle one, tends to be the weakest. The first one and the third one tend to be the strongest. Your hunch and the one that's really a process of all the things you've been thinking about reflecting about and filling in and so that comes a day or so later. Interesting, the power of that hunch is what I'm saying. Your intuition, if you just need to listen to it.

We talk about, you ask what if questions all the time. When I'm talking about this, you shouldn't be sitting around waiting to say oh there's a wisdom to do what and solve all this about how to find a Google or something like that. You got more in your head than you know. The other hand is that some of the great questions in the space program, the way things were designed, what if we did this, what if we tried this, it's okay to do that, I know when we design or involve the design of the toilet in the kitchen in space, we had to what if what if type of thing. What if we tried this, so the what if kind of game is constructive, it's not threatening, it's useful, and it's really fun. You can say what if we do this, or what if we add in this constraint. Or what if we do this for some time? So feel free to do those things readily.

Okay, so lets look at tool number 5. Challenge the rules. I say challenge all the time, always challenge rules and paradigms, but don't challenge the values. Separate the rules from the values, separate the paradigms from the values, so the people who sometimes will challenge a paradigm. The people who hear that are challenging the rules that create it. And the religious political, whatever they are. So be careful you separate values from paradigms and rules and when you challenge, understand how it all begins with values and then you'll have no problems with the values, you're only concerned with paradigms in terms of how they affect you. So look at the rules behind the paradigm and accept them. There's no particular value in not changing the paradigm. If you can keep the rules intact, you can say, I have a better way of achieving these same values, is by using this method now or this particular process or procedure. But if you're not careful then you have composed a new system that people may interpret that as attacking the values and throw it out. I see it all the time. Do you have a question?

I'm not really following. Can you give an example, maybe? Of using a paradigm?

Okay, I'm just formulating in my head. The question came up of these guys that design a device that measure the stickiness of cells. Under the argument that some of the anticoagulants were not as effective as you thought they were. 25% don't change the cell structure at all, and yet they're very expensive. You take them forever and you may have a dying because of a blood clot when in fact you were taking it, but you didn't know. So you could potentially waste a lot of money. So they came up with a little machine to test the stickiness of cells so they assumed everybody would buy this. So they go into a party and offices all over the country, buy this and now there won't be this much plavic. So what they were challenging was the prescription plavics that truly were the issue at all. That's how red and heard felt. So cardiologists in private practice said, you don't need to buy this box because you don't think I'm prescribing plavics right, and I have to hire somebody to operate your damn box and I got to pay for the box and I have to have quality control standards because you think I'm not doing a good job administering the plavics. Did it sell? Company went bankrupt. The way it came forth and attacked the values that were behind it were important ways to support it. See what I mean? It was the way they tried to sell it; there was nothing wrong with the product, it was the whole implementation program. It was challenging your whole management of cardiovascular. So, yes.

One of the interesting things, there's a couple that talk about the values. Sometimes when you look at what it is you're doing, I'm thinking of infusion pumps, a person selling infusion pumps, again, for clots the infusion pumps. And there's a big market out there so people will come out and say this is better than your pump. What's wrong with my pump? No this is better than your pump, faster, cheaper. And so, nothing was going well, and nobody in Volaris was able to sell anything for a while, and we're not addressing. And if we want to sell, we need to go back to the values. Well, what are the values? The people are going to make decisions, typically the hospital administration, they are concerned with an error setting off the infusion, so instead of 3 you have 30, instead of 3 you have 6, whatever you have, you're setting it off so the diagnostic code that you have. So this is a concern. You make a mistake, it costs you 1MM-2MM bucks. So it's a big deal. So these guys said, okay, we got this whole idea wrong. Our product is defeating this other product. What if we, what if pull out and say to the hospital, your value system is these patients and their health and the successful finacial survival of the hospital. We'll say that the peace of this offer for no infusion pump can make an error. If there is anything outside of the standardized norm, they have to get a chief of staff to approve it. So it connects every pump. If you take this offer its 3MM over a period of 4 years, you'll have no more problems. So they're still a huge company. They ended up taking over a huge company. Interesting, interesting, playing with the values. So the values were important. And they sold and implemented a better

infusion pump but on the basis of the value consequence of it and not the device itself. I thought that was interesting.

Another thing when you're considering another project is, some of the things, the classic things, I got to tell you about this, this is my favorite case, problem is it takes too long to get it to market. That's the problem.

There used to be an intracity train that got downtown Houston to downtown Galveston in 45 minutes. It takes times.

They really screwed up everything. Everybody's expectations. So people complain and they signed a petition that it takes too long to get to Galveston. So I went to a big meeting some time ago and it was an economy planning meeting. And it was on and on all this discussion and I said, what's the issue? And it turns out that's not the issue. One of the issues is let's assume for a moment it is the issue. So what if we just raised the speed limit 10 miles an hour to get there faster? Well, yes, we can do that. And you know what the consequences would be? I suppose a little bit of unsafety, but I suppose they will get there faster. What if we build a freeway widener. And they said, yeah, that would work. These things all cost a ton of money, what if we just change our expectations? And they go, what are you talking about? Well, it's only fast cause they think about that because of the damn train did it in 45 minutes, they think they'd like to get there in 45 minutes, maybe that's not realistic. So they said, what do you mean? Well, we can put barriers on the road and cut down one lane so it takes 2 hours to get there. And we take it away in 6 months and it only takes them an hour to get there and they're happy. Now that's not stupid. That's not stupid. It's interesting because it takes as long to get there now as it did 20 years ago. And it's amazing all the emotions and energy people have put into this thing. So, expectation management is often one of the tools you have to work with in implementing your idea. It's an interesting thing to think about. Does that make any sense to you? I thought, you wouldn't believe this incredible meeting of 150 people screaming at each other and finally the only thing they couldn't argue with is people's expectations were wrong. Yes.

You may know that it's kind of endemic to large scale software, but people, or some of the people who sell these large systems, will very frequently intentionally make them crippled in such a way they can sell the fix to very happy customers.

I sort of hate to think that's true.

But it is true.

But, I hear you. I won't acknowledge it, but I do hear you.

Okay, lets skip on to the next.

Tool number 6, how to explore for ideas. Man, I love this stuff. I think you have the challenge to constantly be looking for ideas everywhere and you got to look in places you've never looked before. We have a program here called 'pumps and pipes' which is a relationship between engineering and medicine. It meets every year, you got surgeons and engineers. Normally they talk together how much they really have in common. It's very fascinating. The other thing is you ought to go to a reading that really has an exhibit hall that you know nothing about. You take a notebook with you. I remember I went to a break and clutch journal at the westchase hotel, I even have at breaking clutches. So I get in there, and there's a huge exhibit hall filled with break and clutch stuff, but it's really interesting when you stop and you begin to think of some of the interesting things about temperature, of fluid pressure, abrasive material in it, and you say, oh it's got some application in it. That's kind of interesting. And you begin to open yourself up to some great innovation and others and views, and it's okay to steal the ideas. It's okay. And open yourself up to innovation that's all around you. And don't just go to the same stupid convention you went to last year because you're going to see the same exhibitors every time, generally. Go to some different ones. The next one I went to was great, it was a firetruck exhibit. Now, for a guy, this is really fun. They go the big, you know, hook and ladder trucks and you can climb all over them. And they showed you all the engine features you're so excited about, and I learned a whole bunch of stuff on what I was doing in terms of how I can gain from this. So that's what I was looking at. What drew me to say challenge yourself, and go on a safari to just get an idea of how things happen. Some of the ways that we used to challenge students all the time is how can we use blank and blank. And you get to make up anything. And it can be fooish. But the, take away barriers that are often used to process a bunch of the stuff that you are doing. I'll give you an

example. That sort of classic metaphor example, but let me give you an example. I want you to think, what could you do, if I give you two things to test, types of equipment, and I hope you don't go for more than an hour before she gets upset. You got to think what you're going to do with all the coffee that everybody has. What can you do with it? It's interesting. What can you do with this? Do you know how many cubic yards of oiffee is dumped into the ocean, and is there something useful that can be done? You're right. It keeps animals away from plants, it's an abrasive, it has dye in it, it has all kinds of stuff and we flush it down the drain all the time. It's an interesting thing. It's an interesting challenge yourself, so we say, what can we do with an ordinary thing like 8 tons of coffee per day coming out of the city. Another interesting thing we talk about, I made up all this but we don't have time to do, damn paper boy always throws the paper in the bush. You throw it in the walk so I can get it in the morning. Well, look at what motivates the paper boy. Throw it on your walk and there's no motivation. Now if you had a target there, then he'd try to hit that target, but you're not playing the game. Everybody will play. We all want the same thing, we want mastery. We want perks, we want less rules and a set of challenges. So everybody's got the same thing. So I challenge you.

Okay, I see my hostess is getting nervous.

Using creative language. When you're working with other people certain language is a great turn on and I think we need to certainly appreciate this. If you are exact and precise, and this is logical, this is reason, cause, fact, requirement, well those are hard words. So explain to those with the vocabulary in the early stages your work. Other things is to close approximate tentative are more open to keep the thinking going.

Next two, watch out for first thoughts. We talked about that, there's often more ways to do it, but don't just jump on the band wagon with the bandwagon stuff. Just if everybody gets an answer right way, put it away for a while and come back a day later. Don't jump on to the first thought by any means.

Okay, remember to play. Most creative organizations, has anybody been to google? One. Its quite a place, you're never over 200 feet from a place to eat, free. You eat anything you want. You're never over 100 feet from a playground. A playground can be some chairs and balls that you play with, shoot some hoops, listen to videos, some crappy music it doesn't matter. Talking to each other, throw balls at each other, what kind of business is this? This is really childish stuff here, and you don't have rows of chairs, rows of cubicles, and what you find is that this is another version of the 80/20 rule. 80% of the innovations that facebook and google came out of 20% free time they gave their employees to work on anything they want. Interesting, interesting. Playing tends to liberate you from a lot of these paradigms that do cause these problems, and I think it has ways of being creative.

And the last one, we have just a minute to do this, and I think it's important. Some of the ways to implement things you think is interesting now because it sort of goes both ways. If you're having trouble selling an idea, people can build toys and implement the idea in a toy such that it becomes almost a household phenomenon. Wireless communication and lasers all started with toys. It's amazing and some of the big kids thought they invented it. Kids have been playing with it for a while with some stupid little form. Kids have no resistance to paradigm change if you say you've been talking with this device, but try this. The other thing is sci fi books of films, movies, or plays, these begin Star Trek, there are a whole litany of things that come out of Star Trek and that generation of things. It's amazing how many battle.. do you know what battle bots are? I can give you pages of technology that has come out of battle bots and it's a game where you try to crush each other with little robots, and they've come up with spherical wheels and all types of things that have made a significant difference in medical hospitals the wheels came out of battle bots.

Did you see the news yesterday or the day before that there are now 10 million dollar prize that will be awarded to anyone that can make one of the medical scanning devices from star trek?

Sure, and that's a old kind of marketing then that works. And we see it all the time. So very often you're having an idea you're having a hard time selling, you might get fiction started, a movie started, now you get on youtube, where you make a game out of it because it's easier to sell to kids because they don't have paradigms. So that's informative.