



Stanford eCorner

From Inspiration to Implementation [Entire Talk]

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Tina Seelig, professor of the practice in Stanford's School of Engineering, describes how imagination leads to entrepreneurship, charting the course from rough ideas to polished ventures. Introducing a new framework called the "Inventure Cycle," Seelig captures the attitudes and actions necessary to foster innovation and bring breakthrough ideas to the world.



Transcript

So I want to start out with a question. What is the definition of creativity? I bet if I asked all of you in this room, we would get so many different answers. The same would be if I asked you the definition of innovation or entrepreneurship. And this is a huge problem because if you want to teach about these things, if you want to learn them, if you want to practice them, if you want to master them, you need to have a clear set of vocabulary and relationships between these things. I have to tell you as someone who runs the Stanford Technology Ventures Program along with my colleagues every single week, we get questions from people that say come on, can you really teach creativity? Can you really teach people to be entrepreneurial and the fact is, of course, you can. But one of the problems is that we don't have a clear set of definitions and a vocabulary that helps understand what this is. This is in sharp contrast to other disciplines like physics or math or biology. Because in those fields, we have very clearly defined terms and relationships and those clearly defined terms and relationships then allow us to apply these concepts more broadly, right? The building we're in, drones you might be flying, rocket ships, cars, medical inventions, all of these depend upon some very fundamental principles that then get applied. So I have been thinking about this for a long time. I teach a class called creativity and innovation that I have been teaching for almost 15 years and I realized that we really need a very strong set of definitions and relationships.

So I am going to right now introduce you to what I think is a set of ideas and a framework that I hope will be helpful. And so I want you to tell me at the end whether this is a useful construct for you to think about the way we go from inspiration to implementation. So let's start. Let's start with imagination. Imagination, I define, very simply, is the ability to envision things that don't yet exist. Do you guys buy that? Yes. Okay. Right. I can envision someone coming down the aisle with a plate of cookies, or the Stanford band coming in and playing (4:05) song, okay? So imagination is the ability to envision things that don't exist. Creativity then is applying your imagination to solve a problem.

People often confuse or conflate imagination and creativity but creativity is actually the application of your imagination. So I can envision things, but if I used that ability to solve a problem or address a need, then I am being creative. Innovation then is applying your creativity to come up with a unique solution. So if I invent a peanut butter sandwich, that's creative but it's not innovative. Innovations are when I push through and come up with things that are actually new to the world. Entrepreneurship then is applying our innovation to bring those ideas to life, to bring them to fruition and to the rest of the world. So if you have this set of definitions which I call The Inventure Cycle, you end up with these four pieces of this scaffolding. Now, how come it's a cycle? It's a cycle because entrepreneurship to be successful requires you to inspire the imagination of other people. You can't do it alone. So think of this framework as very much like learning how to talk.

Babies naturally babble. They apply those sounds to make words, those words to make sentences and those sentences to make stories. It's the same sort of hierarchy, right? You start with some basic skills that are very natural like imagination and

then you layer on other things that get you further down the line. So do you buy this? Does that sound - make sense? Okay. Once you have this cycle here, now what you can do is you start parsing it. You can break it apart and look at what has to happen at each one of these steps. What are the attitudes and the actions that have to take place at each part in order to make you successful and to move on to the next one. So let's dive in and see what happens. Let's start with imagination. Now, I have spent a long time thinking about this and I started with a long laundry list of things that are required for imagination, creativity and innovation, entrepreneurship but what I did is I decided that I wanted to get it down to one symbolic action and one attitude.

So that essentially it was easier for us to sort of think about and learn. So imagination requires two things: engaging and envisioning. Now, there's a little bit of a surprise in here, because most people think that for imagination you start with envisioning, right. You sit by yourself - at the base of a tree and you shut your eyes and you envision a world that would be different and then you go out and engage. But it's actually the opposite. You need to start with engagement. Engagement gives you the place to start envisioning what might be different. If you don't have data, if you are not paying attention, if you won't see those opportunities, but most people do not pay attention, most people go through life with blinders on and they don't see the opportunities whether they are problems to be solved or opportunities to be seized that are right in front of them. Consider something even simple like working as a waiter at a restaurant. If you are a waiter at a restaurant, you can go through life just with your blinders on, doing your job, go home and flip on the TV.

But if you are really paying attention, you're going to learn an amazing number of things. You're going to learn about customer service, you're going to learn a lot about customer service. You're going to learn about dietary preferences, you're going to get to meet different customers and learn about the issues that are important to them. If you do that, you might unlock an entire world of opportunities starting by just being a waiter at a restaurant. For - many people, they don't know that they have a passion until they're engaged with something. Let me tell you a story that actually was shared right here on this stage. This is a story that was shared by Scott Harrison, the founder of charity: water. Were any of you in the room when he was here last year? Great, a couple of you. What an impressive talk and I really recommend it. But this guy was not so impressive when he was 20 years old.

When he was 20 years old, do you know what he was doing? He was a promoter at a nightclub in New York and his job was to get people drunk and the drunker he got them, the better. And he was really good at this. And as a result, he became an alcoholic, he became a drug addict, his life was just a terrible mess. And you know what happened? One day, he woke up and said, do you know what? I hate my life, my life is horrible, I need the opposite of my life. So what he did is he wrote to all of these charities around the world and he said, I want to volunteer, I want to volunteer to be helpful. And they all wrote back and said no. They said, you don't look like someone who could be very helpful. So he kept writing letters and he finally got a letter back from an organization called Mercy Ships. And Mercy Ships sends to doctors to places in the world where they go for a couple of weeks to really under-served areas and they provide medicine and procedures. Well, they said, you know what, you can come along if you pay us, okay? And why don't you take photos because you have some background in photography from when you were in college, so you can be the journalist to capture what's going on.

He jumped to the task, he signed his name to his check and he took off. He ended up going to Liberia. And in Liberia, he saw people who were suffering from incredible waterborne diseases. He became impassioned about how to solve this problem. He became incredibly driven and motivated to do something. And the fact is he went back to New York and started this organization called charity: water that has had now a profound impact on helping those 80 million people around the planet who don't have access to clean water. But the fact is he would not have found out this idea sitting in his apartment in New York. This came about by engaging. So the fact is you need to engage before you can envision things that would be different. So once you're imagining the world differently, you then move on to creativity.

Creativity requires two things. It requires motivation and experimentation, right? We, every single day are tripping over problems, tripping over opportunities, most of them don't really grab us. It's like, wow, that really made me frustrated or that was an opportunity, but we don't do anything. But it's those things that motivate us that get us to start experimenting, that's where the creativity comes in. Unfortunately, lots of people don't do this. Most people in the world are puzzle-builders. These are the folks who sort of look at their life as building a puzzle and they have the box top, they know exactly what their life should look like and they are trying to get all the pieces to put together to complete the puzzle. Now, think about it. Are you a puzzle builder? Because what happens if you are a puzzle builder is that if you're missing one of those pieces of the puzzle, what happens? You can't complete the puzzle. These are the folks who say at work, I'm really sorry that part is out of stock.

I am really sorry that person we need is on vacation, they are the ones who say I can't do that, there's a barrier in front of me. True innovators, true entrepreneurs, true creators are actually quilt-makers. These are folks who take all the things they have at their disposal and put them together to create the solution to their problems, okay? So this is what makes someone who is motivated, someone who essentially is looking around at all the resources they have at their disposal. Now, for many people who we read about in the news, the problems that they choose to tackle are those that come up and bite them. There

are things that happen in their life and they go I have to do something just like Scott Harrison being in Liberia and learning about all these waterborne diseases. Let me tell you a story about a really impressive young woman. Her name is Khalida Brohi and she grew up in Pakistan in a very tiny rural village in Pakistan. And in this village, there is a very sad tradition of honor killings. Basically, this means that if a girl does something that her elders think brings dishonor to the family like wanting to marry someone who's not the person they want, they can decide to murder her. Well, she went off to Karachi to the big city and realized things didn't have to be that way and she came back to her town, her little town and her best friend had been killed in an honor killing.

She was 16 years old and she basically said, you know what? I have to do something. I am 16 years old, I don't care I need to put an end to this. And I'm going to play you a one-minute video clip of her being interviewed at the Clinton Global Initiative where she talks about - I want you to listen, she talks about her passion to solve this problem and how that led her to experiment to find solutions. (13:08-14:10) Impressive. But you know what? You don't need some big, huge global mission to find a motivation and to start experimenting. You can start small and this is really important. You can start with a very small little problem that's in your environment and start doing some quick, rapid prototyping to see if there is an opportunity there. The bar doesn't have to be so high. Yes, for some people, maybe they will need to cure cancer or stop honor killings. But for a lot of us, the problems we see are everyday problems that everybody faces and we can start prototyping to come up with solutions.

This is something that is a hallmark of the things we teach in our classes and I'm going to show you an example of how this is done. I'm going to show you a video clip that comes from the design firm, IDEO, many of you, I'm sure, have heard of it, it's just down the street and they're world-known for their incredible innovations. And one of the groups in IDEO is their toy group. And in their toy group, several years ago, they were coming up with a new iPhone app for kids called Monster Maker and they decided to see if this was something that was actually going to work. And so they created this prototype and I want you to look at it very carefully and see how much time it took for them to do this, how much money it cost, how much technology required and how effective it is in testing this concept. (15:28-16:10) Okay. So how much time did that take to make? Not very much, maybe a couple of hours and how much money did it cost? Not so much, right? How much technology did this require? How effective was it? Great. Great. Right. I was giving a talk and there were some little girls in the audience and they came down at the end that they wanted to buy the app, okay? Pretty effective, okay? So this is what I mean when I talk about motivation experimentation.

The bar doesn't have to be so high, it might be, but it doesn't have to be. And this is where creativity comes from. These ideas don't necessarily have to be new to the world, but they are certainly new to you. But what happens if you want to come up with breakthrough ideas? Real innovations. This requires focus and reframing. Now, focus. What is focus? Focus is about a real deep commitment because once you've done your little experimenting to see if it might work, now you have to dive in and say, I'm going to learn everything about this, I'm going to focus my time and attention and this is when you start reframing. Reframing is when you start looking at the problem from all different angles. And this is what I spend most of my time in my class on creativity doing, is teaching students how to do this, okay? Let's look at this. What does reframing mean? This is a problem that has one right answer.

But if you end up taking the same math concept, and asking it this way, you now have an infinite number of solutions. So wasn't that amazing? You went from one answer to an infinite number of answers. The way you ask the question is profound. The question you ask is the frame into which the answers will fall. Let me demonstrate this. I'm going to guess in a room this big, somebody has a birthday today. Does someone have a birthday today? Anyone? How about this week, someone has a birthday this week who would let me - so, okay. What's your name? Morgan. What's that? Morgan. Morgan.

Okay. So all of us here could plan a big birthday party for Morgan. Would that be a good idea? Yeah. Great. Everyone thinks okay. Morgan, we're all planning a birthday party. If we change one word in that prompt to instead of planning a birthday party, we're going to plan a birthday celebration. What happened to the set of solutions? What happened? It completely expanded. What if we said we're going to find the best way to mark Morgan's birthday? Maybe she wants a statue on the quad, okay? The fact is the question you ask is the frame into which it will fall - the answers will fall. So what happens is, if you don't ask the right question, you're not going to get the right answers.

So being able to question the questions you ask is incredibly critical if you want to come up with true innovations. So I spend a lot of time in my classes doing this and I have been fortunate to teach several online classes. I have taught three classes called A Crash Course on Creativity with several like 20,000, 30,000 people in each class, okay? And so we go through all of these projects where they learn how to reframe problems and challenge assumptions and question the way they look at things and then I give them a prompt. I give them a problem. They are working on global teams and the problem I give them might be something like one word. The word might be pets and the team has to figure out how to frame a problem related to pets. They then have to come up with at least 100 solutions to that problem. Why do you think I ask them to come up with 100 solutions? Why not 10, why not 5? It's because it takes getting to that many solutions to start coming up with the ones that are really innovative. The first ideas you come up with are really incremental, they are expected, they are obvious. The next

wave of solutions start getting more interesting, the next wave, more interesting.

In fact, often I have the students come up with the craziest ideas, the stupidest ideas. In fact, even ways to make the problem worse as ways to unlock new ways of looking at this challenge. After that, they have to pick at least one idea to prototype. So then we get to entrepreneurship. Entrepreneurship requires two things. It requires persistence and inspiring others. Now what is persistence? Persistence is essentially grit. It's those people who basically will walk through walls to get things done. It's amazing how important this is, because starting a company is incredibly hard. In fact, it doesn't have to be a company, starting anything is incredibly hard.

Starting a rock band right? Starting a trip around the world, starting anything is really hard, and getting it going and keeping it going, and keeping it alive. It's interesting this morning I was at a - off-sited at a company with some of our students and the founders of the company were telling their story and everyone was sitting on the edge of their chair, because the company was having near death experiences just about every week. And it is amazing how much grit they needed to make it through all of those hurdles. So you need this persistence and grit, which is very much tied to motivation. Remember, we had motivation in the creativity piece. And the thing is that motivation, the creativity ends up sort of spinning around and affecting your persistence here. But that's only one piece, because it's also critical that you inspire other people to join you. You cannot bring ideas to life by yourself. It's about getting people to join your team, getting people to invest in your ideas, getting people to use their products. I mean, even if you're an artist, getting people to come to the play you put on or to look at your artwork in a museum, this requires incredible ability to inspire others.

Now, we spend a lot of time teaching our students how to do this. On one side of campus, it might be called giving a pitch. And on other side of campus it might be called story telling. But all in all, it's about inspiring other people. So I wanted to give you an example of how this might be done and I've decided to use an example from our global innovation tournament. Now we for many years ran a big global competition which was the global innovation tournament where we would give a challenge every year to students around the world. And the challenge would be quite simple. We would give them a simple object like a handful of rubberbands or post-it notes or water bottles and they needed to create as much value as possible. Value measured any way they wanted, starting with this very simple object. And the core of the assignment was to look at things the world is opportunity- rich and to see how they could reframe and look at this very simple thing in a new way.

And of course, they then had to tell the story to inspire other people. So this is an example that came from one of the teams here at Stanford who was doing the project with rubberbands. And you will see that the project they came up with was quite simple, but their storytelling is brilliant. Tired with bikes gobbling up your laces; troublesome doorways; loose laces caught in vicious vacuums; constantly filling your garbage disposal for your shoes; being hounded at school by shoe bandits? You need shoe band. With our revolutionary technology, you will never worry about shoe laces getting untied again. Shoe bands will make you more stylish, lose 10 pounds instantly and will save baby penguins from global warming. Everybody loves them. 50 years of R&D utilize a Six Sigma, lean production and other buzzword processes went into the development of shoe bands. Procured from pencil erasers, our rubber is vulcanized twice, to remove bad karma. Here is what our customers have to say.

As an athlete, I need my shoes to stay on. Velcro provides some security, but to really get the job done I use my shoebands. Recently one of our customers wrote in to tell us about an experience where her shoe bands saved her life. Should've worn shoe bands. Ever since I've started using shoe bands, I've jacked up my bench press by 50 pounds. Hello, I'm the founder of Shoe Bands Incorporated. Not only I'm the CEO, I'm also an avid and dedicated customer. Through this exclusive TV offer, receive not two, but three packs of shoe bands for just five easy payments of 19.99. But wait, call in the next 60 seconds and we will slash the payment and send you a llama. Order today.

Okay. Right, great story. They told you about how your world looks now and how bleak it is and then they paint a picture of how different your world would be once you have shoe bands. Makes you want to invest, right? So now we have this entire Invention Cycle. And I came up with the name Invention Cycle, because I realized there wasn't a word that captured that entire process, from going from inspiration to invention and to bringing these ideas to the world. One thing that's important to note is that every organization needs to have people in all of these roles. Not every person needs to do all of this, but you need those people who are the imaginers, who come up with the big ideas. You need the people who are the creators, who know where to solve the everyday problems. You need the innovators who really need to break through and come up with really bold brand new ideas and you need the entrepreneurs, the ones who know how to scale and get it out. Now there are many people who will never be in this sort of inner circle of doing this, but they're waiting to be inspired by you.

They're waiting for you to have the idea and hand it to them and they go Wow! that inspires my imagination. And this is why you end up within circle upon circle upon circle of innovation and entrepreneurship. This is why this is such a powerful tool in our society it's because creativity, innovation, entrepreneurship, it's a virtuous circle that leads to more innovation and more entrepreneurship and really we can all be change makers using these tools. So my goal with this framework is to try to explain what I think is the process, and I hope this is useful to you, of thinking about the process of going from initial inspiration, from imagination creativity, innovation, and entrepreneurship. And the idea is that once you have these definitions, once you have

these relationships, once you then know the attitudes and actions that have to take place at each step, you're then empowered to know where you are and how do you get to next step. And the hope is, is that once you master this; you are now prepared to get ideas out of your head and into the world. Thank you. So I'm going to invite up Chad, and we're going to have a little discussion. So do you guys all know Chad? He is our trustee TA. He has been thinking a lot about this and he has got a lot of questions.

Yes, so basically the point of this come discussion format is really to delve into a little deeper into some of the concepts you discussed today. And then after that we will have a couple of minutes afterward its open it up to the crowd as well. But to start off, just based on the mindset, a quick question that it come up during your presentation was the idea of interactions with students, with entrepreneurs, with different people who you've shared this new model of looking at the creative process with. What do you think has been the most significant challenge to kind of conveying this to people, especially when they start to think about how they might be able to apply this? It's interesting. I think the biggest challenge I've seen is that often people, and I would say young people, but also people who are not as young look reading newspaper, they learn about entrepreneurship and they quickly want to dive in, I want to be an entrepreneur. But they don't realize that they need to start earlier. That entrepreneurship doesn't just start with you going - you're an entrepreneur, you have to start with something that's really meaningful. It starts with engaging with the world, envisioning what might be different and then creating some really interesting innovations that you can then bring to the world. So it's about understanding that it doesn't just start at the end, you actually have to start at the beginning. So building and kind of digging into that, when especially you're working with a group, in a group project setting where you might not have the same background or people might not be as open to new ideas like this.

How then do you create buy-in within that group to basically communicate these types of ideas and have them feel invested in the process? One of the goals for this model is to actually come up with and share a common vocabulary. One of the biggest issues related to creativity and innovation and entrepreneurship is that we don't have this shared vocabulary and so when one person is talking about entrepreneurship they're thinking one thing and someone else is thinking something else. I mean, this is something that my colleague Tom Byers and I think about all the time is how would we make sure they were all on the same page in understanding what these things mean. And once we understand that, it gives us this common vocabulary for us to work together and to be in sync. And as a team leader in such a setting, to eliminate the preconceived notions that people have already about what creativity means or what innovation means, what entrepreneurship means, how do you go about doing that process? Or what is the process of getting people on to that same definition or track, so that as you communicate and as you move forward, people understand what you mean. I think it starts with just sharing the ideas and giving them some common experiences. We are certainly trying to do that in our classes here, where students in all of our classes get an opportunity to get exposed to this, so that when they come out they can then share these ideas with others. Awesome. Now with regards to just how you apply this, say you're in a work setting, you're in a group setting, I just remember a group project last night where I was trying to think about this cycle and how we might be able to apply it. But at the same time, it was difficult because as we are brainstorming, as we are kind of still like there is no maybe group leader involved.

To think about what the greatest value of a framework like this is and how it really is different as opposed to adding this new jargon or new complexity to a process, what do you think is important to remember as you are - when you're in these team settings, particularly, if you're not the leader to be able to add value and get people kind of moving forward on the same basis? So I've been - slightly - answer part of your question there about the value of this framework, I'm going to turn to the people in the audience. Was this framework valuable? How many people thought that this was a valuable framework to help to think about creativity, innovation? Okay, great. So what we just saw is most of the hands going up and people saying you know I actually never had a shared vocabulary about this, and this is something that will be useful. And so, that's what I'm hoping is that it's simple. If you look at a lot of our definitions of these words, they're so complicated and convoluted. And you don't even - you sort of read them in your eyes glaze over, but coming up with something that's really clean, really crisp, and also shows the relationship between these concepts. That's what I'm hoping is important and will be valuable. Awesome. Awesome. So kind of shifting gears a little now, just thinking as students and we have a bunch of student members, community members here today, if you think about - think back to when you were reflecting writing your book, What I wish I Knew When I Was 20 or just through your life experiences thinking about entrepreneurship, thinking about how you create value in the world in any way.

If you were in our shoes again here at Stanford, undergrad, what advice would you give yourself? Oh, what advice? Well, I think about that a lot. So, the biggest piece of advice I would give is you are the customer. You spend a lot of time trying to get into school and pleasing your teachers, and pleasing the admissions office, but once you get in, guess what? You're now the customer and you get to craft your own experience when you come to Stanford. This is something that a lot of students don't think about. They think they're still in the business of pleasing other people. But really, this is your experience, okay. And so, what you also have to think about is you didn't just get into your department or into your school, you got the keys to the building. That's true in any job you get. In any job you are not getting that job, you are getting the keys to the building. And once you get in you can start engaging and you can start envisioning, and you can start creating and you can start being innovative and you can start doing amazing things.

And if you look around and talk to people who have been very successful, that's what they've done. They've never looked at the job they have, as just the job that's on their business card, they basically see the opportunities that are much broader. And I encourage you to do that at Stanford as well. So, given especially at a place like Stanford where you have, I mean, you are given these keys to so many different types of opportunities and exposed to so many different things. How do you decide what to focus on or how do you maintain that sense of what's important and where to be creative or where you want to add value, especially when there are so many choices and so many keys that we can possibly kind of use? Yes, one of the things I see is often an issue is young people, students who have so many opportunities taking on too many things. And the thing to keep in mind is you can do it all, just not at the same time. And to really this goes to the 'focus' question, picking the few things that you are really going to focus on and dive in. If you decide at some point not to do it, you can go on to something else, but to really be focused on a few things where you are going to really make a big contribution as opposed to trying to do just everything and doing a mediocre job. Awesome. And so, another question kind of in the life lesson, kind of track is, especially given your varied background, varied experiences, having been in companies, having started companies, writing books and really reflecting a lot upon what you've noticed in everyday life and then now as a professor, in the different people you've interacted with and the different experiences you had, how do you think your perspective, or what do you think has been the most significant change in your perspective, since you were in college that you think has made an impact on the way that you interact with people and the way you understand what value you want to contribute back to the world? It's such an interesting question.

When you asked how different I am than I was before? Tremendous amount has to do with confidence and realizing that you have permission to do things. We, so often as young people feel that there is a lot of rules that we need to follow, but most rules are just recommendations. And you need to look at the world as a place where the most of the things that people tell you to do are things to make it easy for them, not to make it easy for you, okay. And for you to figure out where you want to go and how you're going to get there think about the patchwork quilt as opposed to the puzzle that if your life is a patchwork quilt you can pull all sort of resources together to get what you're trying to accomplish. One of my colleagues said the other day; I thought it was a brilliant concept was that if you ask permission, you are just transferring the risk to somebody else. Think about that, right. If I ask you permission to do something, and I am the one who is actually ultimately responsible for delivering it, and you are not, you're much more likely to say no because you don't have the sort of the responsibility, you might have the authority. So it's much better to - this is the old, beg for forgiveness instead of asking for permission, do a prototype, get some data whether something's going to work and then present it to people who might have to give buy in. And once you actually have the data that shows that it's going to work, they are much more likely to give a thumbs up than if you go with a blank sheet and say, hey, I want to do this and it looks pretty risky. That's really good.

What I like, particularly about this, I mean, I just think back to my own experience, and I often struggle with the idea of having that bias towards action and having the confidence to try out these ideas, and like you said kind of a prototyping or prototyping way, where do you think that confidence is grounded in or where is that foundation though as a student where do we - where should we be looking for that or what should we be doing to make sure that we feel that sense of confidence to be able to take those risks and not be afraid? So one of the things that's so fabulous about being a student is, this is a pretty risk free environment. It's an environment where you can do things in a pretty safe place and without really dire consequences. This is what we do in a lot of our classes. We give opportunities for students to try things that they haven't tried before and to gain that confidence tackling things they might have been a little bit uncomfortable if they weren't in that classroom setting. So the thing that I also think is very important is to take small risks and get comfortable with those and then bigger and bigger and bigger. Now listen, one of the things that's really important and I'm curious whether my colleagues who are in the room agree with this, people think that entrepreneurs are risk takers, but they're actually not. They're trying to squeeze the risk out of the things. They're trying to get the best team, they are trying to get the best group to fund them, they're trying to get the best product. They are not trying to take a risk. They don't want to fail.

They want to essentially do something that's really bold. So instead of thinking yourself as a risk taker, think of yourself as a big thinker who has got some big ideas and then you actually have to gather all the resources to make that happen. Terrific. On that note, I think it's a perfect time to turn over to the audience for any questions that people might have. Does anyone have any questions, thoughts yes? I have a question. So in your various roles throughout your life, as someone in a company, now an author and doing different things, where do you see the value of being like on the front line doing something as opposed to creating or framework that other people can use and maybe like if you frame incentive like impact, something you're passionate about when you're trying to achieve the impact that you want, creating framework is a little bit more removed, but it's something that can multiply your effort, because other people can use it. Can you just say a little bit about the pros and cons as oppose to being in the company doing this as opposed to creating this framework for other people to use? That's an interesting question. I think you can be entrepreneurial in lots of different ways. You can be entrepreneurial in a venture. You can be entrepreneurial as an educator.

You certainly could be entrepreneurial if you're starting a company. And my colleagues and I see ourselves as entrepreneurial educators who are really trying to come up with innovations that affect the way we teach. And so, that's the way

I look at this is I'm trying to be an innovator here in the world of entrepreneurship education coming up with some new ideas and then trying to get them out and inspiring other people. So that's, I have had experience out there, starting companies and working in industry and I find that I like most working on the part of this Inventure Cycle, the imagination, creativity and innovation, I find that I love educating people and so that they can go out and start these ventures. Another question, yes? Could you describe how this cycle applied to one of the start-ups you worked with and like what challenges you might have faced with each step or like something particularly, I know I had a couple of experiences that stick out in my mind and was just wondering... So, okay. So I want to ask you a question and then I will tell you a story. When you look at this, does this map to your experience as an entrepreneur? Yes, it definitely does. I mean, it definitely - I think it highlights some of the places where I might have taken missteps, where I might have skipped steps or tried to do step a different degree ... Great.

So our - what's your name? Patrick. So, Patrick, just said, he asked me to tell a story about how this whole thing would fit together and he said this maps to how his experiences and also highlights some of the places where he might have missed some steps. So let me tell you a story -- so I'm not going to tell you a personal one, because - but I'm going to tell you an example from one of our other speakers here, Sal Khan. You guys know Sal Khan in the Khan Academy? I was fortunate enough to chat with him about the Inventure Cycle and he was really excited about it, because he said this is - and I have talked to many, many entrepreneurs as well. Think of his story. He started out, he was in finance. His life was really nice. He didn't have anything to worry about. But he started then helping his young cousin who was struggling in math. He was now engaged, right.

He was - let's see if I can pull this up. It's not going to work there, okay. Okay, he was now engaged. He started envisioning then ways that he could influence her and influence other people's learning of these complex math concepts. So he started, he was now motivated to help her and he started experimenting. He then start pushing the limits and started innovating and launched the Khan Academy site. And then, he spent - started sharing it and getting out in the world and that's where he then started needed persistence and inspiring other people. So this story maps very, very well to most people you talk to who have actually started entrepreneurial ventures. It starts with being engaged, envisioning something would be different, starting to experiment based on their motivation and then pushing to innovations that they then push out to the world. Another question, yes? One of the books you wrote was about things you wish you'd have known when you were at 20? Yes.

Can you state one or two of ...? Of the things, okay. That you think are the most important things ...? Great, okay. So the question was I wrote this book called What I wish I Knew When I Was 20, what were some of those things? I will tell you a couple of them. One of them was to make your own luck. When I was a kid, my father used to tell me all the time the harder I work, the luckier I get and I thought that was really great advice. And I realized as I got older that that was only one way to make yourself lucky was hard work, that there are tons of other things you do to make yourself lucky. For example, a colleague of mine who works in Chile, he tells his students that in every room there is a million dollars waiting for you. It's up to you to find it and that million dollars is a metaphor, it's not real million dollars. It's a metaphor for interesting opportunities. Look around this room, the people who are here are amazing.

If you're not meeting new people, if you are not engaged to everyday, if you're not paying attention, you are missing opportunities. So you make your own luck by being fully engaged, doing things that are outside of your comfort zone, building your portfolio of interests and then you can start connecting, combining them and really making amazing things happen. So that's one, making your own luck. The other as I mentioned before is, that most rules are just recommendations. And that - and a third one, which I mentioned, and the third one is about failure. In the book, I talk about the fact that I have my students write failure resumes; their biggest screw-ups, personal, professional, and academic. And you might ask why they do that? Well you know what, if you're not failing sometimes, you're not taking enough risks. You're not getting out of your comfort zone and - but it's really important to mine those failures for learning. And so by writing a failure resume it's not just your failures, but what you have learned from each of them. And in fact I put my own failure resume in the book.

I realized if I was going to talk about it, I needed to share an example and whose else was I going to put in, than my own. And it was quite an interesting experience writing it myself. I often, if I make a mistake which I do quite frequently, I say, okay, one more thing on my failure resume. I really mine it for things I've learned and move on. And that's one of the things that we're very fortunate about here in Silicon Valley is a culture that is very understanding that if you're taking big risks and doing things that you haven't done before, that there is a high likelihood that you're going to get surprises. In fact, one of the things I think about a lot is the concept of failure and I don't like that word. As a scientist, when you do experiments and they don't come out as you're expected, it's still data. And data can be mined and the more interesting and unusual the results, the more interesting the findings and the insights you can get. So if you look at your failures as data, and then mine them, he can learn tremendous number of things. Another question, yes? I wonder if you can talk about the grit and the perseverance piece a little bit.

Any tactics or ideas of what to do when that feeling that you need to just push through, and maybe when to know when to pivot instead of persevering? Yes, that's a really, really hard question. It is something that certainly can be taught. I have been reading a bunch of papers about this and there is definitely evidence that people can learn to have more persistence, have

more grit. And one of the major things you need to do is have this sort of growth mindset. Those people who have a fixed mindset and probably you're familiar with Carol Dweck on this from across campus. But people who have fixed mindset who basically think, this is what I can do and if I fail, that just means I'm a failure as opposed to those people who say I have a growth mindset and therefore when I hit a wall, this is an opportunity for me to really stretch. And so it's about giving yourself stretch goals. I think one of the biggest lessons I've learned through my life is that if you take steps that are big enough to be challenging, but small enough, so you're pretty confident you can make them. And if you constantly are giving yourself these type of challenges that are going to stretch you, but that you have a pretty good chance of making, that's when you end up becoming most successful. Those people who take tiny little steps because they're - and they know they're going to be confident, don't make it very far.

Those who take huge leaps where it's very, very unlikely they're going to finish end up falling on their face a lot. So it's about understanding yourself and what I found over my - from my experience is that the more skills you gain, the bigger those steps can be, because you can now combine the skills you've gotten from other experiences and take bigger steps. Another question, yes? Tina, this is a very interesting concept because a lot of times you think all of this is in one person. In your mind, in an organization here or in a big company, what's the best way to assemble this? It's really interesting. When I first started working on this, I imagined this all had to be in one person. And I gave a talk, or the prototype of this talk and there was a gentleman in the audience who was not too happy with me and we had quite a long exchange afterwards and he basically said, you know what, I really - I'm an entrepreneur, but I'm not very creative. And he made it clear to me that he was someone who was really great at scaling things, really great at sort of sharing other people's ideas, but he was the kind of person who needed someone else to hand him the innovation. And I realized that was a really interesting point. Is that everyone doesn't have to be good at all of this. When you are founding a company, it's one of the reasons that we like founding teams, because you can get people with complementary skills who are going to help you fill out this whole thing, and so, the whole Inventure Cycle.

And so when you're putting together a team, one of the most important things to do is to think about who plays different roles and can fill in this entire process. Another question, yes? I wonder if you can speak a little bit about school and more specifically like one thing I'm sure you've noticed in your experience teaching is that like the students who were kind of bit with entrepreneurship have this itch to get out into the real world, and oftentimes you lose site of the, I guess, the charms of being in academia and being in a place like this. So I was wondering since you've seen them both, what are things that we as students should be cognizant of and really make the most out of, while we have the chance? Great. So the question is what should we be making the most out of while we're here at Stanford as opposed to getting this incredible itch to get out? Well, one of the things that's most amazing at Stanford is just the people here. And it's a huge opportunity to get to know your classmates. These are the people who you are going to be working with, you're going to be working for, who maybe working for you, who we're going to found ventures with, it's an amazing opportunity to build your community. It's also an incredible opportunity to build your wealth base of knowledge. You know what, I spend a lot of time in my book *InGenius* talking about this, is that your knowledge is the toolbox for your imagination. If you don't have a toolbox for your imagination, essentially, you could say you're engaging and learning and having a whole sort of box of insights, you don't have anything to work with. I can teach you was many creativity tools as you want about reframing problems or challenging assumptions or connecting combining ideas.

But if you don't have anything to connect and combine, you can have anything to work with. So it's really important to get the base of knowledge to work with. We often talk about here, and many of you have probably heard the concept of T-shaped people? Those people with a depth of knowledge in at least one discipline and then a breadth of knowledge across others and also including innovation entrepreneurship, I think that's what you want to do is get out of school is get that depth of knowledge. It's interesting, I'm neurophysiologist by training, and you might say how does that help me? It helps me everyday. I know what it's like to go deep into a field. I often use examples or metaphors and that - and I can walk into most organizations, and there are things that are relevant based on the things I learn through that experience. So I would certainly not discount my education at all. Now of course there are people who have some burning desire to go run and start something, go for it. As I said, you're the customer, you need to map your own course and there is no right answer. It's really up to you to chart it.

Any other questions? So, let me ask you just in closing, I would love to get some insights from you. What I just take one second to let me know what part of this Inventure Cycle model is the most interesting or valuable or insightful for you, and maybe even any open questions, since this is a brand-new idea for you to give me some feedback. Anyone want to share some insight on this that you would be - how you might use this? Yes. I always thought of creativity and innovations kind of being synonymous and the distinction between creating unique solutions and those created was helpful. This is really, really important. So what she said was that most people think of creativity and innovation as being synonymous. And I have to tell you I fell into that trap too. I was teaching this class called creativity and innovation for dozen years before I realized you know what, I'm actually using these words the same way, and it's a huge missed opportunity. If we think of creativity as idea that's new to me, but innovation is an idea that's new to the world, we also open-up the opportunity to push ourselves beyond the creative ideas to come up with real innovations. So I'm going to thank you all for your time, your attention and your enthusiasm.

Thank you.