

**JOE MCGONEGAL:** This is the MIT Alumni Books podcast. I'm Joe McGonegal, Director of Alumni Education. In the summer of 2008, Greg Brandeau, class of 84, SM 85, had a serious problem on his hands. As Senior Vice President of Systems Technology at Pixar Animation Studios, he had a major release coming out called, simply, "Up." On the schedule for Pixar's mammoth rendering computers in the next two weeks, Up was projected to be a \$1 billion major movie release. Unfortunately, it was scheduled to render, the process by which each single command of an animator's directions becomes digital film, at the same time as a new complex experiment in short film, Cars Toons.

Brando had personalities to manage, and deadlines with Pixar's owner, Disney. But most of all, he had a serious logistics problem on his hands: how to find the computing power to get both projects done on time. Brando has collected the happy ending to this story, and other lessons in innovative leadership, in a new book, *Collective Genius: The Art and Practice of Leading Innovation*, published in 2014, and co-authored by Linda Hill, Emily Truelove, and Kent Lineback.

Greg Brandeau, thank you for joining me. Why write this book now? What gaps in our understanding of leadership, or business, does it address?

**GREG BRANDEAU:** That's a really good question. So, when we started out to write this book, I was puzzling about, how was it that Pixar had made five unbelievable movies in a row, and no other studio had ever done this? Now, it's, Pixar has made 14 blockbusters in a row, without one miss. What was causing that?

You could imagine the case that we had hired the smartest people in the world. I thought about that for a while, and I said, "You know, we've really got amazing talent here." And Pixar's got seriously talented people. But you go see other movies that are great, too, that weren't made by Pixar. So it's not like we've hired the best, all the best movie people in the world.

Well, I wonder if it's how we're managing the process that makes what we're doing better. When I met Linda Hill, a professor at Harvard Business School, she and I got talking about this problem. And she had just written an article called *Collective Genius* for the Financial Times. We realized that nobody had written a book about how you lead for innovation. We firmly believed that it's the context in which people work that allows them to be innovative. And so, instead of taking of the role of the leader, as in the traditional sense, where they have a vision,

and they have people that follow and execute what they're saying, the leader's role, in our view, they thought of themselves as organizers of a place where other people could thrive, rather than, they are the ones with all the ideas.

And then the other thing that we had to debunk was, the big-- a lot of people think that innovation comes from one person. It just springs from the mind, as like, oh, here's a new idea, and it comes out fresh. And that's not the way it works.

It actually is a bunch of, you try this. You think about that. You talk to this person. You have a discussion with somebody else. You read something. You work on it for a long time. And then you have your innovation.

Once you start thinking about that, you realize, then, how you organize your team of people to have the right interactions will allow you to have better innovation.

**MCGONEGAL:** The book was 10 years in the making, I think?

**BRANDEAU:** It took us about 10 years. We started out, and then we just became more and more interested. And then we didn't want to do a shallow book, where we just looked at something, and hadn't thought about it. Linda, being an academic, wanted to do research. And I wanted to make sure that what we were saying was actually accurate.

And when we originally started out, we were going to write a book about Pixar. But the problem was going to be, is that everybody is going to laugh at us, because they'd all say, "Well, of course you can do that when you are Pixar."

We realized that we had to go out and find other organizations that were similarly innovative, and see what they were doing. We went around the world and we talked to Islamic banks. We talked to a luxury goods manufacturer in Korea, that makes high end handbags for women in Asia. And they're doing Louis Vuitton. We went to a law firm. And we were just blown away about how this law firm, who was actually DLA Piper, had organized themselves to be more innovative for their clients.

And so it turns out that that's how it ended up taking 10 years, just because we kept on finding places where you would never expect to see innovation, and it was happening.

**MCGONEGAL:** The book also argues about balance between, you call the paradoxes, of what individual workers need, and teams need, and when leaders strive to find that balance. That's the sweet

spot for innovation, no?

**BRANDEAU:** Yeah, exactly. The leaders in these really innovative organizations don't see themselves as the person that has all of the great ideas. They might have, certainly, their own contributions to it. You know, I realized a long time ago that I'm smart. I went to MIT. But there's other smart people in the world. People that work for me. If there's one of me and 10 of them, the chance of those 10 coming up with a solution that I haven't thought of, versus me coming up the solution, is way higher. If I have 100 people working for me, it's even higher.

So then the trick is, how do I get all of the little slices of genius that's available in each of the individuals that work for me, allowed to be expressed, so that they feel safe to say what they think, to have vigorous discussions with each other.

We discovered that there are paradoxes about this. I want to take care of the individual person in my organization that have all the ideas, right? So those are my individuals. And then I have an organization that needs to be successful.

So you have a tension. You have various tensions that you're trying to balance, so that individuals feel safe, and yet you're not so mollycoddling of the individuals themselves that nothing is getting done.

**MCGONEGAL:** After reading of your early relationship with Steve Jobs, what he would make of a lot of this approach to innovation and leadership. What's the Steve Jobs book review of Collective Genius?

**BRANDEAU:** That's a really interesting question. I hope that he would think that I have implemented some of his best ideas, and understood that I can't recreate another Steve Jobs. So Steve was just born the way he was. There's nothing I can do to you or me that could turn us into Steve Jobs. He really was that good.

Steve created three multi-billion dollar companies. And you say, three? Well, the first one was Apple number one. Then he bought Pixar for \$10 million and sold it to Disney for \$7.4 billion, 20 years later. That's 30% compounded annual growth, year after year. It's crazy.

And then he did Apple number two. He went back to Apple when Apple was about to go out of business, in 1997. And you know, the market cap was like, I don't know, \$100 million, whatever. It was not much. And now, they're the number one market cap in the world.

There were things that he did that I think that we also agree with. So, for example, Steve firmly believed you want to hire the smartest possible people you can find, and have them work together. And Steve had such a strong force of personality, and such a sharp mind, that he could argue you into the ground. If you didn't know what you were talking about, he would convince you the sky was green, not blue. Reality distortion field.

The thing that I learned from him is that, when you have chance encounters, walking around, and you're talking to people-- it's seeing somebody in the hallway, where you realize, "Oh, I wanted to ask that person a question. And there's that person right there. I'm going to ask them right now." As opposed to when you're in a formal meeting, where there's an agenda, and you're talking about things, and there's no time to ask that question. Or you had no time to just think on your own.

So Steve's contribution to Pixar was, he built a building that accentuated the human interaction of different disciplines. He put everything that everybody needed on a daily basis in the center of the building. So all the bathrooms are in the center of the building. The food is in the center of the building. The conference rooms are in the center of the building. So basically, there's no way for you to go to work in the day, and be there all day long, and not have walk to the center of that building and bumped into somebody.

Now did we already have the great talent, because we worked in these crappy old little tilt up buildings in Point, Richmond, and made three or four great movies there? Yeah. We did that. And then we moved to another building that was nicer, and made it easier to work. And we made 10 great more movies.

So is it just the building? No. But it's the way you think about the way you treat your people. And I think that Steve got that. And I think he would have said, this is a good book.

**MCGONEGAL:** What's the 11th chapter you would write now? Or is there another firm that you're really just hot on right now, where you see such innovative leadership?

**BRANDEAU:** Ideo would be a great one. Tim Brown has actually written a number of books. That's a terrific organization. They really understand innovation, and how to get teams of people to work together, and get the best ideas from everybody, and how to do rapid prototyping, and so forth.

But I think actually, the deeper question is to say, how do you change the traditional

organization, which is just command and control, to be more innovative? Because our view is that the world is changing so fast that if you are not innovating, you're going to be out of business in a few years.

In 1929, if you were listed in the S&P 500, the life expectancy of you being on the S&P 500, your company, was about 75 years. In 1980, if you look at the companies that were on the S&P 500 in 1980, and you follow them through time, the life expectancy is 15 years.

So if you're not innovating, you're dying. Kodak, going into bankruptcy. They were one of the biggest companies in the world. Or, this is a long time ago example. But Digital Equipment Corporation, when I worked there. When I was at MIT, actually. They were the number two computer manufacturer in the world. They don't even exist anymore. And there are kids today that have never even heard of them.

The innovator, Ken Olson, who founded DEC, and he actually famously said, or infamously said, "Why would anybody want a personal computer in their home?" And the engineers at Dec were some of the best engineers in the world. And they could easily have done this. But they missed the idea. And I would argue, it's because Ken Olson was the visionary for that company, and he was not able to organize the company, such that other ideas were coming out and new markets were being found by the people in the organization.

So it's not like, because you get big, that you are therefore guaranteed that you're going to make it.

**MCGONEGAL:** Take me back to your MIT days again. The Athena Cluster was just getting started when you were here. And I couldn't help but think of those, in reading your story of finding enough computers to do some rendering of both of these projects at once. Do you remember the Athena Cluster?

**BRANDEAU:** Yes. So that's a huge change in the world, that-- I mean, Moore's Law actually matters. Athena was you of the infancy of that. But that was really just, from my view, that was exploring, how do you use computers to do intellectual work? So now you can build things like Mathematica, to do mathematical modeling, right? You could build AutoCAD, or 3D modeling programs, that would allow you to design things better. You could build SPICE, a circuit simulation tool.

Prior to that, it really wasn't possible to have access to a computer. You had one central

computer. In fact, I used this thing before Athena, which-- they had a MULTICS machine, which was just an incredible operating system. But it was time shared. And you know, you went in, and used it, and you had your number of credits that you could use every month as a student. And when you used them up, you didn't have any more. You had to either buy them, or get them from somebody else.

But having ubiquitous computing everywhere changed the way MIT worked, and changed the way the world worked as well. The funny thing that happened to us at Pixar, that is a really good example of Moore's law.

When we make a movie at Pixar, the frames generally take eight hours to be computed. And they always take eight hours, no matter how much compute power you have. Because, as a process, you have to have your frames ready the next morning for review. So you only have overnight to get them done. And if they're taking 20 hours, you're not going to get to look at them in the morning. And if they only take an hour, well, that would be great, too. But we never, you always have more ambition, and you want to do better special effects. And so what would happen is, all of the ambitions of the visual artists would get bigger and bigger and bigger, no matter how much compute power you had. So the frames would always take eight hours.

So when Toy Story was made, we only had so much compute power. Let's call it X. And when we made Cars, which was about 10 years later, we had roughly 300x, because A, we had more money. But B, the computers had just gotten faster.

Well, at about this time, 3D films were coming out. And we thought, wouldn't that be cool if we went back and made a 3D version of Toy Story? Because we had all the data, right? And it was like, OK. But the software had changed. So we had to do some work. And bring all of the models, and the animation into the new world, so it could be computed again.

And so, frames that took eight hours in the past would take two seconds. So, instead of taking what a current movie would take, because every frame takes eight hours, and it would take, and you have 130,000 frames in a movie, we could actually render Toy Story faster than real time. And it was just because we had so much more compute power.

**MCGONEGAL:** It's just a sea change in authorship, right? And kind of a challenge to traditional Hollywood categories we see at Oscar time, right?

**BRANDEAU:** It totally is. And so, this is actually, this goes on all over the place in business, where there was a existing business model of, this is the way we make movies and tell stories. And then this new piece of technology came along, that enabled a whole new art form to be created. So it's still a movie, but it's a computer generated movie.

And so suddenly, you can create movies that, in places that are just in your head. It doesn't have to be a live action set anymore.

I would argue that with Kodak, a similar thing happened, where computers came along, and you could make a digital camera, and you don't need film anymore. The irony with Kodak, of course, is that Kodak invented the very first digital camera. Yet they hid it away, because it was going to destroy the rest of their business.

Well, their business was going to be destroyed anyway. They had the opportunity to go and innovate, and build the best digital cameras in the world. And yet they didn't do that.

**MCGONEGAL:** They were their own worst enemy.

**BRANDEAU:** They were.

**MCGONEGAL:** Hasn't our notion of failure changed? We now allow for and encourage quick productive failure, to paraphrase Google X?

**BRANDEAU:** In Silicon Valley, the hot thing to say is, "Fail quickly." I think Tim Brown coined that term. I talked to Tim about this, and I said, "Tim, wouldn't you rather succeed quickly? And he says, "Absolutely."

Tim was being provocative when he said, "Fail quickly." Because people, of course, were always thinking about, succeed quickly. And you can't have any failures, right? And he was pointing out that if you don't iterate as many times as you can before you release your product, your product is not likely to do very well. Because you learn something from each generation.

So think of it as a science experiment. You have a belief about how a product should work, and so you make a prototype of it. And you show it to some people and say, "How does this appeal to you?" and you think it's perfect, right? And then you get user feedback, and it's like, "Well, this doesn't really work that well, or that doesn't work out well, or I don't like the way this is."

And so then you go back, and you take all that feedback in, and you do it again. And you show people, and you get feedback again. And you just keep on iterating in this way, so that when you actually release the product, it's killer.

**MCGONEGAL:** It's not necessarily version 1.0 when you release it. It's gone--

**BRANDEAU:** Absolutely. It's actually, we're calling it version 1.0. But actually, it had you know all these alpha and beta versions. And you go up the learning curve so fast if you do it this way.

None of us are smart enough to actually know what's going to be the perfect thing. But how do you, inside of your organization, tolerate failure? Somebody makes a mistake. Do you fire them for making a mistake? If you do, you're not going to have very many people that are going to stick out their necks, that are going to try something that's innovative.

**MCGONEGAL:** Would you tell me what you're writing next?

**BRANDEAU:** Well, I wrote this book because Linda said, "Hey, we should write a book." and then we, Emily came on board with us, and Kent came board with us. We actually have enough material to write 10 books. But it was never my goal in life to write a book. I merely wrote this book because I saw all these things that we were doing at Pixar, and other places that I'd seen, that if other companies could do these things, the world would just be a better place. Because we'd all have nicer cars, or nicer toasters, or better, less energy problems, or bus pollution, or whatever. Innovation solves a lot of problems.

**MCGONEGAL:** Tell me what good books you've read lately.

**BRANDEAU:** I'm currently reading Capital by Picketty. I saw that in Technology Review, and that looked interesting to me, and picked it up. It really is quite an interesting book, and turns out to cause controversy. Which means it must have something interesting in it.

I read, recently, Give and Take by Adam Grant, which is a surprising book about how people, you think that people that rise to the top are always takers. But there's actually data that shows, and that's what Adam Grant wrote about, shows that givers actually can be more successful than takers, which I thought was fascinating. I'm kind of a giver, and. I've always been wrestling with that conundrum. Am I too nice?

One of my favorite recent books is Drive by Daniel Pink. That book describes how the workforce has changed through time. Back when we had the feudal system, there was one

way of managing things. And then we had the Industrial Revolution. That was another way of managing things. And now, intellectual work. You have to manage people differently, and people's expectations are different.

So those three books are terrific. And then, because this is an MIT audience, I just have to tell about a few other books.

**MCGONEGAL:** Please.

**BRANDEAU:** One is *The Martian*. It's a science fiction book about a guy stranded on Mars, and he has to get back to Earth. It is hardcore science, and really well-written. *The Idea Factory*, which is about Bell Labs. Beautifully written and researched. All of the inventions that Bell Labs have made have changed the world we live in. And having been Course 6, I really appreciated that, how cell towers got invented, and how transistors got invented, and so on. Just is fascinating beyond belief.

*Billion Dollar Lessons*, by Chunka Mui, who's also class of 84, talks about the problems that companies have when they are trying to make a decision about whether they're going to acquire a company, or they're going to do a project, where they get group think going. They have all the information that they need to make a good decision. And then somehow, they ignore it.

Chunka did really extensive research and wrote a really brilliant book.

**MCGONEGAL:** Greg Brandeau's new book, *Collective Genius: The Art and Practice of Leading Innovation*, is now available online or at your favorite local bookstore. Greg Brandeau, thank you for joining me.

**BRANDEAU:** Thank you so much for having me. It's been a real pleasure.