

THE ASPEN INSTITUTE

ASPEN IDEAS FESTIVAL 2016

ASPEN LECTURE
THE FUTURE OF IMAGINATION

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LIST OF PARTICIPANTS

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THE FUTURE OF IMAGINATION

(9:00 a.m.)

SPEAKER: Good morning, everybody. Can you hear me? I just want to make a quick announcement about later this morning. So, everything is on deck up till 11:20 a.m. today. Everything is sort of normal on your calendar. I just want to explain a little bit, if you haven't heard, or haven't had a chance to read your app et cetera, what's going to happen then.

We start serving lunch, even though some of you are still eating breakfast, at 11:00. The Vice President will start to speak around 1:45. We have to load a lot of people through a magnetometer, and we're doing it in waves. So, if you're interested to go to Tom Friedman, who will start speaking at 12:30, the doors to the Koch Building, which is the only access to Greenwald today -- one door, one magnetometer -- will be open at 11:30.

I would grab your lunch, you can take it through, there's snacks on the other side of the Koch Building. You can go back and forth into the Koch Building, use the restroom, et cetera but once you leave the Koch Building you have to back through the line. So once you're in, you're in. He'll speak from 12:30 to 1:30 and we know people will load in at the same time.

Newt Gingrich speaks in this room at 11:40. Everybody who comes to his talk will get in to see the Vice President. So, if you feel like, "What am I going to do, will I actually get a seat?" You'll totally get a seat, welcome you to stay here, otherwise you're going to sit in the other place for a long time.

So we'd love to have a full house here so that we can stagger it. And if you just want to go have lunch and talk with friends that's fine, we'll have a lot of food here and also over on the other side of campus. So, we are trying to stage the flow into Greenwald for the Vice President's talk. We're so honored to have him, but it's

going to take a little time and I just recommend that you stagger the line and don't worry about getting in.

I want to tell you why I'm so excited to have Jane McGonigal here. I had the pleasure of seeing Jane at TED several years ago, to give you a sense of her, she's had 4.2 million views of her TED Talk. She's been so written up that she's a bestselling author in the *New York Times*. Of the many accolades, *Forbes* has called her one of the 10 most powerful women to watch.

Oprah has said, "She's one of the 20 most important and inspiring people in the world." *New York Times* has said, she's -- "One of the 10 breakthrough ideas in science is hers." *Business Week* has said, "Top 10 innovators to watch." *MIT Tech Review* -- which I love -- "Top 35 innovators changing the world through technology." and *Harvard Business Review* -- which I know you all subscribe to -- is, "Top 20 breakthrough ideas of the year."

Jane is going to -- to add, "My number one goal in life is to see a game designer nominated for the Nobel Peace Prize. I am forecasting that this will happen by the year 2023." We're going to hold that to you, maybe it'll be you. But what's really fun is she's going to talk about imagination. And Tina Seelig gave a great talk on creativity earlier this week. And I think -- if you can tell me after this -- I think we should do a whole track, maybe across the week next year on creativity and imagination, I think that's one of the most important things we need to think about.

(Applause)

SPEAKER: Please welcome Jane McGonigal.

(Applause)

MS. MCGONIGAL: Thank you, Jini (phonetic). Good morning, welcome to the final lecture of the festival. We are here today to challenge and stretch our powers of

imagination. And in my line of work I spend a lot of time helping people imagine things that are really hard to imagine. And what is my line of work? Well, I'm a game designer. And I'm also a futurist.

I research what the future might be like. I talk to people about the future they might live in some day. And this is not exactly a common combination of career paths, as far as I know I'm the only game designer futurist, but these two lines of work do have one important thing in common.

As a game designer and as a futurist I see it as my job to transport people to worlds that don't exist, to imaginary places. Whether they are a virtual world or whether they are a world we might live in someday, a world that might come to pass or might not come to pass. And my goal as a game designer and as a futurist is to make sure that when people leave these imagined worlds that they feel more creative, more optimistic and most importantly, that they feel more confident and certain of their own capability to transform those worlds.

To take actions and make decisions that affect the shape of that reality. Now, this is pretty easy to do in games. When we play games we're constantly experiencing this sense of agency. Every turn we take, every move we make changes the state of the game, and this is why playing games can be such an empowering experience.

We're constantly aware of our power to change the scene of that world. When people think about the far off future, and not just their personal futures but the really big futures, the future of our industry or of society or of the planet, far fewer people feel that sense of agency.

Far fewer people believe that they can personally make decisions and take actions that will transform the shape of that future world. So what I try to do as a futurist is to make sure that people do come to feel that they have that power and moreover, to try to give them skills that actually increase the likelihood that they will

be someone who takes creative actions or makes strategic decisions that determines what the future world will be like.

So, we're going to work on some of those skills today, which is why I'm going to teach you how to do two things today. And let's see if we can get -- there we go. Today I'm going to teach you how to predict the past and how to remember the future. I see from the looks on your faces that many of you are thinking, "Wait a minute, that's not how we're supposed to do this," right?

Normally, we try to remember the past and we try to predict the future, but you can reverse the order here. You can try to predict the past and remember the future, it turns out to be an incredibly practical skill. And I'm going to teach you how to do these two things today and to give you a little sense of where we're going, let me share with you some of my inspiration.

This is a great line from Lewis Carroll's "*Through the Looking Glass*," the White Queen is lamenting to Alice, "It's a poor sort of memory that only works backwards." I love this line, I love that it's a creative paradox, it's kind of like a Zen koan.

You know, these seemingly nonsensical statements that were designed to help monks in their training to have these dramatic flashes of intuition instead of just using their logical mind. And I think this is kind of a Zen koan for us. And Lewis Carroll, you know, was writing "*Through the Looking Glass*" long before we had the scientific tools to prove that there is in fact a form a memory that works both backwards and forwards.

But now we know that there is, and I'd like to show you what that is. It's called counterfactual memory and here's how it works. Imagine if instead of doing 'X' at some point in your past you had done 'Y' instead, how would your life have turned out differently?

Now to give you an example, if you went to college perhaps you had a second choice college; you could easily imagine, "What if I had gone there instead of where I went, how my life might have turned out differently?" Now, it's important that you're imagining actions that you took, not, you know, "What would have happened if we had lost this war?"

This is about your life, okay? When we try to imagine how our own lives might have turned out differently by imagining different actions that we could have taken or different decisions we could have made, this is what happens in your brain; your brain tries to predict or simulate the way reality would have turned out.

And there are three key regions of the brain that activate whenever you do this. It's not important that you know the names of the regions or all of the neuroscience behind it, but I'll tell you what the three parts of the brain are regarded to do when they activate. The first, the hippocampus, that's the part of the brain that is involved with constructing and re-constructing memories.

Whenever you're trying to learn something new or you're trying to recall something, this part of the brain activates, kind of stores all of the building blocks for your memories. There's also a part of the brain that's in charge of mentalizing, which is when you try to imagine what other people might do, you try to use your social intelligence and intuition to effectively predict how other people will react.

And the third part of the brain is the part related to something referred to as cognitive control and performance monitoring. And that means that you are scanning reality constantly for opportunities to take action. You're looking for opportunities that relate to your own goals.

So, you're looking for, "Is this the moment when I take an action that will help me get closer to achieving a goal?" All three areas of the brain activate whenever

you try to imagine how the past might have worked out differently. And this is a really interesting neural combination, this way that the brain reaches for something that didn't happen, but that could have happened, using kind of a combination of logic, and intuition and imagination.

You might be wondering why do neuroscientists know what happens in your brain when you're doing counterfactual memory? Well, one of the reasons why they're interested in this practice is that predicting the past is an effective intervention for depression. When people are asked to do this daily, they report lower rates of depression and it makes sense when you think about it.

One of the outcomes of counterfactual memory, of trying to imagine how things would have turned out differently if you had taken a different action, if you had made a different decision is that it reminds you of the control that you have. That you do have agency, that you have influence over how your life turns out.

So, people who are imagining the past and how it could have gone differently report having a greater sense of control over how their own future might turn out. So, this is one reason why neuroscientists are interested in looking at what's going on in the brain because any time anything helps treat depression it becomes interesting to neuroscientists.

One other thing that is kind of intriguing about this practice of predicting the past, how the past might have turned out differently is that immediately after predicting the past you experience a boost to your creativity. So if I ask you to come up with a lot of different solutions to a problem, you'll come up with some really interesting strategies and solutions that are very divergent and why does this happen?

Well, when the brain tries to reach for something that doesn't exist, a past that doesn't exist, you're trying to imagine something that you can't have a direct

reference for, kind of opens up the brain, unlocks the brain to think differently. You're trying to imagine how things could have been different in the past and this allows you to imagine how things could be different in the present.

So you become a more creative problem solver. So, that's something kind of interesting, and just to give you an idea of how you might practice this skill in everyday life, it's really simple. You just -- any time you have a little bit of downtime, instead of pulling out your phone, just play a game of "What if?"

Here are some good counterfactual memory questions. Think about a time in your life when you moved, "What if I hadn't moved and I were still living" -- wherever that was -- where you grew up, where you went to school, where you had your first job.

"What if I had taken that job I turned down?" Can you imagine an alternate career path for yourself? What if I had been allowed to choose my own first name? So these questions don't have to be super serious, right? What if you had chosen your name? What name would you have chosen, how might that have affected your personality or your course in life?

And it can be really simple, what if you had gone to the airport this morning instead of coming to this lecture and you had gotten on a plane, where would you have gone on that plane and what would you be doing differently? So it can be even small, even related to just the tiny decisions you make, okay?

So, keep that in mind. This is a skill you can practice, it helps you increase the sense of control you have over your own life and makes you a more creative problem solver. Okay, now I promised you that we were going to talk about the kind of memory that works backwards and forwards.

That's what the White Queen wanted, that's what we want and that's the form of memory that works backwards and there is a version of it that works forward too. We had counterfactual memory, there is also something called counterfactual foresight, it goes in the opposite direction.

Here's how counterfactual foresight works. Imagine yourself in the future doing something you've never done before, describe it as vividly as you can. And in fact, when we do scientific experiments on counterfactual foresight, we'll have you write a journal entry from the future. So, you write as if it had already happened.

So in a way you're trying to remember this future, okay? To give you an idea of how practically you do this, it often follows the XYZ format. X refers to actions you have previously taken in your life, and I'd like to just try to do this with someone, Tina will you help me out?

SPEAKER: Yeah.

MS. MCGONIGAL: Okay, X is an action you've previously taken, what is something you have cooked at some point in your life?

SPEAKER: Honey mustard chicken.

MS. MCGONIGAL: Honey mustard chicken, okay. Y refers to people you actually know in your life. Who is someone that you know, Tina?

SPEAKER: My son.

MS. MCGONIGAL: Your son, okay. And what is the place you've been to at some time in your life? That's what Z refers to, places you've been.

SPEAKER: The Galapagos.

MS. MCGONIGAL: The Galapagos, okay. Tina, have you ever cooked honey mustard chicken with your son in the Galapagos?

SPEAKER: No.

MS. MCGONIGAL: All right, we have now found a counterfactual future for you to imagine. So, you would imagine yourself in the Galapagos, cooking honey mustard chicken with your son and this is what counterfactual foresight looks like.

And I would ask you to write a journal entry explaining in as vivid detail as you can what this was like, imagining as if you had done it. And you get bonus points if you can explain how you got there, and this is where the real imagination kicks in. What are you doing cooking in the Galapagos with your son? What course of events could have taken you there? This is counterfactual foresight.

I think it's a lot of fun. This is what happens in your brain when you try to do counterfactual foresight, when you try to remember the future. It's the same three regions of the brain. It's the hippocampus trying to construct and re-construct a possible reality. It's the mentalizing part where you try to remember the actions other people might take and it's the cognitive control and the performance monitoring where you are looking for actions that relate to your own personal goals.

Some interesting things happen when you engage in counterfactual foresight. One thing that happens is that every time you remember a future that hasn't actually happened you rate that future as more likely and the more vivid details that you describe about this future that has never happened, the more likely you are to really start to believe, "I might be on the Galapagos someday with my son cooking chicken, this could totally happen."

You start to believe that this is possible. This is an effect that I think could be used for good or for

evil, depending on how you harnessed it. I am an optimist and I try to have a positive impact on the world, so I try to think of ways that this effect might have a positive impact on someone's life.

So we know, for example, if we can get young people to imagine themselves going to college and vividly describe what it's like to walk onto campus on that first day or what it feels like to choose that major or walk on graduation. They believe it's more likely and therefore, they're more likely to take actions that support.

They will actually fill out an application, they will actually take the steps towards that goal if they believe it's likely it can happen. I think if you're trying to create change in the world, this can be a very effective skill too. If I believe, for example, that a game developer could win a Nobel Prize someday, I want other game developers to believe that that future is possible so that they try to make games that are worthy of that kind of award.

So if I could get them to remember the future in which this happens and try to imagine even themselves being the recipient of that award, maybe they'll be more likely to make games today that take them on that path. So, this is a skill that could have some pretty influential impacts.

Another thing that happens after you try to remember a counterfactual future is that you experience a burst of creativity. So the same kind of measures of, can you come up with lots of different ideas, lots of different answers, strategies that are rated as unusually divergent.

This too will happen after you try to imagine a future that hasn't happened. Again, whenever the brain reaches for something that isn't there and you're forced to bring it, will it into your imagination, will it into existence, it enables a burst of creativity after.

So let's just try this right now altogether. Let's remember something that hasn't happened yet. I'd

like you to just play along in your own mind with the XYZ format. Let's say X is a strenuous physical activity. Maybe its running, maybe it's doing a cartwheel, maybe it's dancing, maybe it's lifting someone up on your shoulders.

I want you to just pick a strenuous physical activity that you've actually done in your life at some point. Does everyone have a physical activity in mind? Okay, Y is a person you care about, someone you know, someone real in your life, who is alive and you could possibly have a future interaction with. So everybody pick a person.

And Z is a favorite faraway place. A place you've actually been in your life that you have some real experience with it. Okay so, we've all picked that. Okay so now please imagine yourself doing this physical activity with a person you care about in this faraway place.

Just try to picture it for 10 seconds and if you're like me and you want to go for the bonus points, you might try to imagine how you got there, what are you doing in this place, why are you doing this activity, how did you both wind up in this location?

So that's a really simple example of how you can use this XYZ format to try to remember futures that haven't happened and now, of course, you're more likely to think that whatever you just imagined could happen someday. So, if any of you ever do that thing that you just imagined, please contact me and let me know, that will be kind of fun.

Okay so, one thing that researchers are really interested and intrigued by these days is the fact that there's such a similar neurological activation that we see when we try to predict the past and when we try to remember the future. So, this is a side by side comparison and you can see that all of these regions are activating in similar patterns.

Remembering the future we tend to see less activation. You can see on top it's a little bit more blood flow to those regions. It's a little bit easier to predict the past than it is to remember the future. We have a little bit more to go on, there's more data about the past than there is about the future, we don't always have a lot of good data about the future.

But the regions are the same and this was really interesting to researchers and it led to a lot of headlines when this line of work started to be published and you may have seen headlines in places like *Discover Magazine* or *The Science News* saying things like, "Remembering the past is like imagining the future."

Or, "Thanks for the future memories to the brain remembering the past and visualizing the future looks surprisingly similar." Now when these headlines first came out people who worked in the field of futures research were really anxious. This was not good news because for people who work in futures work were always trying to get people to imagine how the world could be different.

People tend to underestimate how different the future will be, they tend to underestimate the possibility for transformative change, they just can't get their mind to something that hasn't happened yet. And to find out that we are constrained by how we think about the past when we think about the future, this seemed like really bad news to futurists.

This seemed like it was making it a hopeless cause to try to empower people to imagine totally different futures because we were always going to be using the same part of the brain that we use to think about the past. But when you dive into the scientific literature, you realize that these headlines are a little bit misleading because it is not the same neurological activity when you remember something that actually happened and when you think about the future.

What is -- the common neurological activation is when you imagine how the past could have been different and we also found out that it is not when you just imagine generic pasts and generic futures that you see this really interesting neurological activation, it has to be your own past and it has to be your own future.

And for me as a future forecaster and as somebody who wants to inspire people to try to directly shape the future this was a big 'A-ha.' I realized we had to get people imagining their own lives in these futures. That it can't be abstract, it can't just be about big systems. That they have to have a kind of autobiographical memory of the future that they're trying to imagine.

So that was an interesting insight for us, but it was nice to see the neuroscience connecting, predicting the past with remembering the future, connecting counterfactual memory with counterfactual foresight because it does help us realize that there is another way to imagining how the world could be different.

This is a quote from really kind of seminal handbook that was published a couple decades ago before the neuroscience came out that was also encouraging people who want to change the world to think about how the past could have been different. And they say, "Without considering alternatives to reality we must accept the past as having been inevitable, and therefore the future would be no different from the past."

The generation of counterfactuals gives us the flexibility in thinking about possible futures. So, thinking about the past, how the past could have been different helps us better able to think about the future can be different and I'm really interested in possible futures.

I work with the Institute for the Future in Palo Alto, California. We're the oldest future forecasting organization in the world and this is the sign that you

will see when you walk in the front doors and it really illustrates our philosophy of thinking about the future.

This is based on a sticker that you would get if you visited the World Fair in the 1930s and they would show you people with jetpacks zooming through the air and the kitchen in the future where robots are making your food for you and then you get this little sticker saying, "I've seen the future."

As if the future were this immutable thing that somebody could show you and then you could sit around and wait for that to happen, "I'm waiting for my jetpack," "I'm waiting for my robot maid." But in reality the future doesn't just happen, people make it.

They make it through the decisions that they make and the ideas that they share with the world and so we don't try to predict the future. We could care less about being right about the future. What we try to do is imagine all of the different possible futures so that we can figure out which of these futures we actually want, and then, how do we make these futures a reality.

So, our philosophy is that we think about the future to find out what's possible. To find out how things could be different. And that's because to create something new or to make a change in the world you really had to be able to imagine how things could be different.

You can't invent, you can't innovate, you can't create, you can't change your own life or anyone else's unless you can imagine how things could be different. And the future is a place where everything can be different because it hasn't happened yet. That's why we're going to do a little bit of future forecasting together today, to try to imagine how things can be different.

But before we do that, I want to tell you one more intriguing thing that we found about predicting the past and remembering the future. It turns out there is one other form of thinking that activates the exact same

neurological patterns as trying to predict the past and remember the future. One other kind of thought process that activates those three regions in that really interesting form of imagination and intuition and logic.

I'm just going to give you a second, can you imagine what that third type of thought might be? Well, it turns out, it's empathy. Trying to imagine what someone else is feeling, particularly if it's something you have never imagined yourself. If you have not gone through an experience, you haven't lived a certain life, you have to conjure up -- just like trying to imagine a past that never happened or a future that hasn't happened yet -- you have to try to conjure up something that you have no direct access to, no direct data about.

And it's -- this is really interesting as people have done more neurological research on empathy it turns out that empathy is a lot less emotional than we thought, it's actually a lot more creative.

And what I mean by that is that empathy isn't necessarily something we feel, but it's something that we actively construct in our mind and to be fair, it's not all empathy. It's hard empathy, which is the most important version of empathy. And let me explain what I mean by that. There are two forms of empathy, easy empathy and hard empathy.

And I will give you an experience now where you can just have a firsthand experience of easy empathy. This is not what we're talking about, but I'm going to show you a video and I want you to see if you can put yourself in this person's shoes, can you feel what they're feeling, do you understand what's going through this person's mind? All right, there we go.

(Laughter)

MS.MCGONIGAL: We'll just -- and this is easy empathy for a lot of reasons. One is that most of us have had birthdays, we have been kids excited to -- "I don't

know if there's presents coming, there's a clown coming, I'm not sure what," but we've been excited, we've been this kid and this sort of delight and awe.

And it's also easy empathy because we can even mirror our facial expressions. Sometimes you watch a video like this and you start to mirror and actually make the expression yourself and then you really start to feel what they're feeling. Okay, this is easy empathy, we do this all the time, it comes naturally to us and it's great and it feels good.

But, it doesn't have the impact that hard empathy does. Hard empathy is when we try to put ourselves in the shoes of somebody who is different from us. This is just one person that I thought some people -- I personally -- would have a harder time trying to imagine what this person is feeling in this moment and what brought that person to this place.

The ability to feel and imagine what somebody else is feeling and thinking when you do not share those thoughts and feelings, when you have never had them yourself, that's hard empathy and it's interesting for a couple of reasons. Hard empathy is the only form of empathy that is linked to taking future action.

So, while it may feel good to have this kind of easy empathy, "I feel what you feel, I relate to you, I like you more now," it does not change our actions. We're not more likely to help somebody after we've had that experience. We're not more likely to change our own behavior or make a different decision.

But when we go through the practice of hard empathy, when we're successfully able to imagine and construct in our own minds, a feeling or thought we've never personally had, that is linked to taking different action in the future.

So, that's one reason why researchers are interested in it, and this may not surprise you now since

it activates the same neurological patterns as predicting the past and remembering the future, immediately after practicing hard empathy, if you're able to get to that point where you think you have ability to imagine what the other person is thinking or feeling, you experience a burst of creativity for the same reasons.

You have tried to unlock that part of your brain that can imagine things that you've never imagined before. So, I call this a triangle of "What if" three different practical skills that you can do pretty much any time, anywhere. You can try to remember a future you've never experienced, as if you had already experienced it, you can try to predict how the past could have been different and you can try to practice hard empathy. To think of somebody who's really different from you or someone you really don't agree with and try to access that thought or feeling in your own mind.

And what's really good news is that these three activities tend to reinforce each other. If you want to get better at imagining the future, you can spend some time trying to cultivate empathy for people who are different from you. If you want to have more empathy for people who are different from you, you can do some counterfactual memory exercises.

So, this is a really wonderful reinforcing triangle and all these activities ultimately in the scientific literature get linked to the kinds of thinking and problem solving that lead to more creativity, more invention, more innovation, more optimism about these futures being more likely, a greater social intelligence and ultimately a greater capacity for change, which is why I am so obsessed with this area of research.

And as a game designer, it occurred to me that perhaps I could make games that allow people to practice this triangle of "What if" in more complex and longer lasting ways. Could I give people an experience of imagining "What if." Of trying to imagine how things could be different and what would that lead to.

So that's the kind of games that I've been trying to make for the past decade, really sparked by this question, What if we could play, What if together? Let me give you an example of one of these future forecasting What if games that I've made to kind of give you an idea of how playing What if could lead to invention and innovation, more creativity in the present.

So, in 2008 I made a game called 'Superstruct' with The Institute for The Future. This is a game set 10 years in the future and part of the premise of this game was that a super computing system that was processing all kinds of data about reality and it was typically forecasting the potential extinction of different species like a rare squirrel species, it would spit out some data and say, "Hey everybody go protect the squirrel, go protect the seal."

The premise of this game is that one day the computer, to everyone's surprise, spits out Homo sapiens might actually be on the endangered list in the next couple of decades, and there were five factors leading to this data analysis, different causes that might lead to the endangerment of our species.

Things like a pandemic, things like disruption to the food chain and we asked players to come together and imagine themselves in this future, to remember it, to talk about what they did in this world to try to address one of these five problems.

So, you pick one of these five problems; I happened to pick quarantine and everybody was asked to tell stories about the actions they took in this future, very personal, using skills you know already. So, it's a pandemic, what could I do? Well, I'm a game designer.

There's this gamer stereotype that gamers like to stay home alone, always playing games in their basement, and normally I get really annoyed by that stereotype,

however in a pandemic it's actually quite good for people to stay at home alone in their basements.

(Laughter)

MS. MCGONIGAL: So I decided to invent a game that would only come on during highly contagious periods and everybody would stay home and play this game. So, there might be like a CDC alert that, "There's a lot of contagion today, everybody stay home and play this game," and nobody would be upset about having to stay home because they're playing this amazing game.

I did some research and I found out that in historic times of pandemic one of the hardest to shut down vectors for contagion were dancehalls and nightclubs. That there's just something about young people, even in times of pandemic, they've not stop going out to dance clubs and these social environments.

So of course, I decided that I should make it a dance game. So really want to make sure people are not going out and spreading this disease, so I invented a game where you stay at home and dance in your basement. But it's an online game, so you're kind of dancing socially with other people. So, this is just imagination, I didn't have to make this game. However, there was someone from the CDC playing the game and we actually did talk a lot about how we could combine our super powers in this future.

So that was that game. We had almost 10,000 people tell these stories about what they were doing in the future. And I write about this game SuperBetter in my first book if you want to hear about what some of those stories are. But the thing about this kind of personal foresight of remembering the future your own -- autobiographical story of the future. Is that it can inspire experiments, prototypes and innovations that you are uniquely qualified to make. And it just so happens that after we did this forecasting game it was about four or five months later, I just had this itch, I thought I kind of really want to make a game where people stay at home and dance alone in the basement but they're really

dancing with people online.

So, I created a game called Top Secret Dance Off and I created my own little social network for this and invited people to dance at home and to create an avatar for themselves and make videos of themselves dancing. And just see if you have an idea of what this looks like, I'm going to show you a video and I want -- I want you to notice is that the goal of this game to level up your dance abilities. But they're not like your normal dance abilities because most people aren't that good at dancing and I don't want you to not to want to play. So, let's watch this video. Sorry it's low resolution. It's an old game.

(Video being played)

Okay. So that's Top Secret Dance Off and I just started inviting some people to play and I thought it would be like a little prototype. And people would leave comments saying "Oh, here plus one exuberance, plus one humor." Then so many people were playing the game and became completely obsessed with this game, the average player was playing this game on this like six hours a day, which was a lot. I realized I needed to automate the leveling up system I've been doing it in a Google spreadsheet, so I am like, no, we need some code now, we need a database.

So, I wrote some code and made it automated so that you could watch somebody's dance video and just click on a button and give them a level up in one of these dance skills like plus one sneaking (phonetic) as a plus once style. Okay. So -- and that would have been enough. That was a great experiment, I enjoyed making that game, it was awesome.

But then something else happened. The World Bank called me not about the dance game that was not something that the World Bank was interested in. But they were interested in teaching social entrepreneurship skills to students in Sub-Saharan Africa and they had created an online course and they'd been working on it for years and they'd only managed to actually get 20 students to complete

this course. They were not into it, they weren't excited about it. They thought maybe if it were more like a game we could get more students excited about it. I've been wanting to do some work in Sub-Saharan Africa for a while so I said, "Great." Let me start thinking about how we could do this.

We created a social network around the graphic number about the future using the exact same, social network platform that I'd used for Top Secret Dance Off but we just totally, not about dancing anymore, it's about social entrepreneurship and use the exact same code for players to give each other, leveling up points but not about dance skills anymore, this time it was about social entrepreneurs skills like entrepreneurship and local insight and resourcefulness and sustainability.

With that code we were able to run 20,000 students from 130 countries through this game in the first 10 weeks of launching, this project launched in 2010 they're still doing versions of this game today, which is great, which is exciting.

But I can tell you for sure I would not have been ready to say yes to the World Bank, to the scheme if I had not had this crazy idea, when I was thinking about the future and decided this should really be a prototype in dancing. So, the moral of that story is that imagining the future does prepare you to be more creative and inventive today.

When we think about the future we're not trying to make accurate predictions. We're just finding out what's possible. We're trying to imagine things that we haven't imagined before. We're going to do that together in a minute. I hope most of you have your phone with you because I am going to ask you to play future forecasting game with me and it's going to be very easy you can do it on Tweeter, if you're on Tweeter you can go to a mobile site and play it together. And to explain a little bit about how this game is designed I'd like to share with you a quote from someone who you cannot give this kind of talk without quoting.

He has a good quote for everything I mean it's kind of amazing. But this is a quote I've been obsessed with for almost a decade. He once famously said, "The games are the most elevated form of investigation." And this seems like a really, weird thing for Albert Einstein a scientist, a physicist to say. Shouldn't he have said that science is the most elevated form of education, or physics is the most elevated form of education? But he said games were. And I've -- this quote kind of floats around and the context is not entirely clear.

Everybody says he said it but nobody's quite sure what he meant by it. So, I've been trying to figure out what he might have meant by that. One thing we know is that Einstein was an avid chess player. In fact, he used to write letters to his friends and colleagues lamenting how many hours he was spending every day playing chess and he actually wrote that he was afraid, he was addicted to chess, which is great because you know, not everything changes, as we move to the future. Here is Albert Einstein worrying about being addicted to games. So, for those of you who may worry about that today you're in good company.

But he was obsessed with the game chess and -- and I think how is chess a kind of investigation. Well, chess is a problem, it's a constrained problem, it's a -- it's a kind of spatial problem kind of spatial engineering problem, how you move pieces around the board to create different states, it's a long-term strategy, kind of problems or resource management problem. And every time you sit down to play a game of chess you're trying to solve that problem and you might be trying to solve it in creative ways.

And the person sitting across from you is also trying to solve that problem. So, you're kind of investigating this problem together. And every time another two people sit down to play this game they're trying to solve this problem with their own ideas and their own strategies. And you can think about how bad humanity probably was at chess the first time people started playing it. And then you fast forward to all these decades later and think about how good the best people in the world are at chess.

How much knowledge they have about it. How many strategies have been cultivated. How thoroughly understood the problem of chess is. And we only got to that point by having millions and millions of people sit down and try to solve this problem from their own point of view and then kind of collectively leveling up our knowledge of this problem space. Now, that's chess.

We see this happening in online games too. There's a lot of knowledge sharing, strategy sharing, comparison of approaches and techniques.

And sometimes when you look at an online game, when I look at online game I get really inspired by the heat maps of where players are, where are they trying to solve problems and where are they taking actions. This is from EVE Online this is -- this is what I want thinking about the future to be like. I want people coming together in this burst of creativity. And so, that's why this is what the game that I made to think about the future, looks like and the game that we're going to play together.

This is a screenshot of a game that's live right now. This is the actual game that we're going -- we're going to play together and you can see all these little dots are stories that people are telling about what they would do in a particular future. But what future are we going to look at together today. Every game about the future starts by collecting signals. How do we decide what future to think about.

Signals from the future are things that are happening today, technologies that are being invented, changes in our demographics, forces that may continue to develop and cross paths that might determine what the future is like.

All futurists love this quote by William Gibson the science fiction writer. He said the future is already here, it's just not evenly distributed. So, the idea is that you can actually get a pretty good idea of what future we might wind up in by looking at the most interesting and disruptive things that are happening today, somewhere there

are these clues of the future.

So, I just want to share with you a couple of the clues about the future that a lot of futurists are excited about, and particularly at the Institute For The Future, and then we're going to kind of take them in an unusual direction.

This is a signal I'm sure many of you have been tracking Bitcoin and Cryptocurrencies. How many of you feel like you've heard more than you ever need to know about Bitcoin, we'll hear a little bit more about it then. Okay. So, what's the big idea behind Bitcoin that is this decentralized currency. There's no bank, there's no nation, there's no central authority in this virtual currency system. Anyone can send a Bitcoin to anyone else and there's no intermediary, there's no authority backing this currency, it's just the international community.

So, anyone can send Bitcoins to anyone else and you get this constantly updated, verified collective record of all transactions because every time a transaction is made that information goes to everyone in the network, everyone has a copy of it, makes it hard for there to be fraud or hacking of the system. Why should we pay attention to the signal? So, there's 7 billion dollars worth of Bitcoins in circulation right now that's one reason to pay attention. There are three million people trading Bitcoins. There are over 500 Bitcoin ATMs so that's kind of interesting.

And then within a thousand Silicon Valley backed start ups with over \$1 billion in funding right now using Bitcoin, is kind of amazing. Now, when we try to imagine the future we try to take these signals and put them in new context. So, we're not going to talk about the future of finance today. I work with a group called the ACT Foundation and they are dedicated to coming up with innovation for learners ages 14 through 29, who are low income learners and trying to figure out how to make higher education more affordable, more sustainable and more effective in helping them find meaningful careers.

So, that's what the ACT Foundation is interested

in. And so we decided to play what if game with them. What if there were a Bitcoin for higher education? This is not something that is as easy to imagine because Bitcoin is in finance and education is different. But what would it look like if we had a Bitcoin for education? What if learning and credentialing were as radically decentralized as money has been in this system? What if we valued and verified learning that happens anywhere?

What if anyone could be a teacher and grant credentials to anyone else so kind of take out that middle man, the authority of accredited institutions. And what if we had a public collective record of everything everyone has learned ever and who they learned it from just like the Bitcoin record is a record of every transaction, and who gave the coin to who, to who, to who. What if we had that kind of global collective record of everything everyone's ever learned and who they learned it from.

When we try to imagine future we look for signals that reinforce the idea this could be possible. The blockchain technology that powers Bitcoin definitely makes this feature seem more possible. Blockchain, which we've had a lot of sessions about here at Aspen this week, is a shared public ledger open to all. It's a platform for everyone to know what is true. Many people refer to it as the Internet of Trust and because there's so much code involved with keeping this information attached to different things that you can enable automatically executed smart contracts.

So, blockchain is just a system for keeping track of information and attaching that information to different things whether it's a bit of currency or an educational credential. And so, we could play what if with this blockchain technology as well. What if a degree became more like an open ledger? So, blockchain allows you to keep adding information sort of infinitely to something. What if instead of getting a degree and finishing our education we had an open ledger of everything we are ever learning.

We never expect to shut it down what if we just have this ledger forever. So, what if no one ever

graduated? Can you imagine a world in which high school graduation or college graduation is no longer a thing -- this is where we start to really imagine how the world could be different. What if the assumption that education is completed before you start your career is turned completely on its head? We can also try to think about what if learning were treated like a currency? What if learning credits were part of work compensation so instead of just a salary you're also guaranteed a certain number of learning credits for work that you do.

What if we could pay down student debts by teaching what we learned for it, so learning becomes a kind of currency? What if we could get paid for learning instead of the other way around? All of these what if questions led us at the Institute For The Future and the ACT Foundation to imagine a world where education is very different than it is today. Where working and learning are combined in a really radically new ways and so that this old idea of first you learn and then you work goes away. I want to show what that future might look like.

(Begin video being played)

SPEAKER: Your ledger account tracks everything you ever learned in units called Edublocks. Each Edublock represents one hour of learning in a particular subject. Anyone can grant Edublocks to anyone else. You can earn Edublocks from a formal institution like a school or your work place. But you can also earn them from individuals or informal groups like a community center or an app. The ledger makes it possible for you to get credit for learning that happens anywhere even when you're just doing the things you love.

Your profile displays all the Edublocks you've earned. Employers can use this information to offer a job or a gig that matches your skills. We'll keep track of all the income your skills generate and use that data to provide feedback on your courses. When choosing a subject to study in the future you may wish to choose the subject whose students are earning the most income. You can also use the ledger to find investors in your education. Since the ledger is already tracking income earned from each

Edublock you can offer investors a percentage of your future income in exchange for free learning hours. Our smart contracts makes these agreements easy to manage and administer.

The ledger is built on blockchain, the same technology that powers Bitcoin and other digital currencies that means every Edublock that is ever been earned is a permanent part of the growing public record of our collective learning and working.

SPEAKER: Always learning, always learning that's my motto. I try to learn something new every month but it ain't easy.

I'm a freelance delivery driver so my schedule isn't steady. One thing that helps, I love to read. So, I listen to a lot audio books when I'm driving memoirs, history, philosophy. Oh, and I got that app that gives you blocks whenever you finish a book.

SPEAKER: I started teaching last summer right after the federal government announced the Pay it Forward program. You know about that, right?

If you have federal student loans from college you can pay them down by teaching someone else what you learned. Whatever blocks you earned in school you can teach them to others. The University of Texas that's where I did my degree. They report all my college credits directly into the ledger so I am pre-approved to teach any subject I passed like virtual reality programming. If I can teach someone that course I get \$2,500.00 off my debt. I use the same text book that I used in college and I Skype with them three times a week to answer questions and help them with their coding assignments.

SPEAKER: Yes, I won. This is Texas Folden (phonetic). It's one of those protein folding stimulators where you learn how proteins work inside the human body and you can now solve puzzles for science. Every time you solve a puzzle you earn this biochemistry Edublock and the better you get at it the harder the puzzles get. Well, I guess I got pretty good at protein folding because one day

this trophy showed up and they started giving me super hard puzzles working on these mind blowing structures that even the real scientists haven't figured out yet.

But wait a minute, I am one of the real scientists now actually because I'm not just earning Edublocks now they're also paying me for every puzzle I solve. This game is sort of like my first class in biochemistry and it's also my first job.

SPEAKER: We use to have this concept of entry level jobs. You would start with a company and then you could move your way up. That's how I started here. We hardly have any fulltime jobs here. We mostly hire on a project basis. We check their ledgers and if their credentials match our needs then we'll put them in the hiring pool. Of course, relationships are still important and we still help people grow. They're earning Edublocks with every hour of work they put in.

Every project we hire for we don't just list the monetary compensation. We also list exactly how many Edublocks in which skills areas we'll grant you. That way your work here counts as learning for your next gig. It's all connected.

SPEAKER: Why give someone a generic test when you can actually evaluate their work in a real world context.

When you log into a verification site it gives you a task, an opportunity to do some real work for a real client. You can write some text, you can translate, you can design a logo, create an essay, crunch some data that kind of thing. You're even paid for your time not the going rate more like minimum wage. When did anyone ever get paid for taking a final exam?

SPEAKER: It's tremendous what you can do with the ledger system. There are teachers everywhere that are waiting to share what they know. You can really truly pursue any dream or passion you had. Of course, it's overwhelming, you can get lost in the options. There are always tradeoffs.

Sooner or later most people find themselves at a point in their learning when they need to make a decision. Do you go for the traditional college degree? Or build your own higher education? That's the kind of tough choice that a lot of young people are facing right now.

SPEAKER: When it's my turn to teach I take it really seriously because for me learning has always been the one thing that's connected everything else in my life. Where I've been? Where I'm going? I may not know where that is yet but I know I won't be a driver forever and when I get there I know I'll still be learning.

(End video being played)

MS. MCGONIGAL: So, that's when we launched the game. We've had more than 11,000 people who have a stake in the future of higher education, whether it's people who work in higher education or the students who are in high school today thinking about their future. And I'm going to invite you to play with us around these ideas, if I can just go back to my slides. I should say one thing about that video. When we imagine the future sometimes we imagine the futures that we want, make it really exciting, we try to make them.

Sometimes we imagine the futures and we decide we don't want that future that is not a future I want I'd like to do things today to make a different future more likely. Do I need some -- oh, yes there we go. So, reactions to that scenario have been really different. Some people look at that and get very excited. Some people look at that and thinks it's a dystopian world. So, it's -- okay, we actually practiced two forms of imagination when we think about this -- these types of futures.

Positive imagination and shadow imagination where we think about the things we're excited about in the scenario but also the things that we're worried about. Now, I want to get you guys on this platform because we have a very unique opportunity here at Aspen. We have this amazing collective intelligence and creativity in this room. And I am going to ask every person, this is my ask

of you, to share one reaction to this future in the game platform so everyone shares one reaction, we'll be able to add several hundred new points of view to this future.

You can do it two ways, you can do it on Twitter, I'm going to give you some hash tags. If you use the hash tag the game will automatically scrape up your response from Tweeter and put it into the game or you can go to the mobile website, which is LearningIsEarning2026.org and you can play cards right on the website, you can create your account signing in on Facebook or Twitter, it's really easy. And here we are, we're going to play, What if? Okay.

So, it's the year 2026, imagine that learning has been radically decentralized that anyone can teach and think of it as a kind of transition the way that social media has been, almost everyone, not everyone but most people on some form of social media today sharing their life.

What if in future most people are teachers and most people are able to give you credit for learning something that they've taught you and employers are teaching this whole inter-connected world. What's something or anything that excites you about this and one thing that you think is positive. If you use the hash tag learn positive on Twitter our game will scrape it up and if you're on the website you can use the hash tag or just play your card and or positive imagination.

So, I'm going to give you 30 seconds to think of one thing that excites you about this scenario. I'm happy to see all of the texting now, good.

And when you're done if you can make eye contact with me I'll get a sense of how close we are to the next act of remembering the future. And if you've already -- by the share an idea to share it while we're waiting. Looks like we're about half way done. Great.

So, another type of imagination we like to use is shadow imagination. So, I would ask you to look at this future from the other point of view. What's something,

anything that worries you about this scenario? Use the hash tag learn shadow or if you're on the site play a shadow imagination card. That's the card that allows you to share, what makes you anxious.

Gosh, I wish I had my phone I would be looking at what you guys are playing. These are the two questions we always start every game with. What excites you about this future? What worries you about this future? And then we try to ask some questions that dive a little bit deeper maybe make it a little more personal.

So, let me show you another question that we'd like to ask and if you're ready for another imagination challenge. What's a one place someone might earn learning credits in this future that they can't today. And if you make this personal it would be more effective.

What's something you do that you think you might deserve to get granted a learning credit for? For example, I play video games, I learn different kinds of thinking, on leadership or communication skills in playing them. I could imagine that every time I complete a level on a video game I could get an Edublock in the future. Why not? If you can think of some place that you could earn learning credits in the future that you can't today, use the hash tag, learn anywhere. And the video we saw the delivery driver getting Edublocks every time they finish an audio book. What's some place we could get learning credits that we can't today?

If you play one idea I'd encourage you to keep going. What we found in our foresight workshops is that usually the really good ideas start to happen at the third or fourth idea. Your first ideas maybe the most obvious idea, once you keep diving deeper you start to have some really interesting insights.

I'm just going to show you a few other types of questions that we ask. If you go to the game website you'll see a bunch of imaginative prompts listed to answer questions in different hash tags that you can find people having different conversations.

One of the things we like to ask people to do is read a headline from this future. So, what's the top new story in this world and it could be a positive news story or a negative news story just to give you some examples. Investment in Edublocks in the US now exceeds endowments of the top 20 universities combined.

Federal government announces it will begin accepting Edublock, teaching credits as payment for student loans. Edublock laundering ring broken up. Three million Edublocks confiscated by federal investigators, right.

When you treat learning as a currency this type of thing might happen. By the way, all the stories that you saw on the video were inspired by us asking people to just say what would you do in the future where learning were decentralized in this format.

So, if you think of a news headline you can add it. And then maybe -- I think this is the last one I have in here. Is to pick one thing you know a lot about and this is where we really start to get surprising ideas about the future. They can be anything that we know a lot about on a learning or start up culture, writing books, travel, fitness records, mental health, being a parent, government, the Constitution whatever.

Anything you know a lot about pick that thing and start sharing ideas how that thing might change or adapt in the scenario. One of the most fun areas that I've see played out in this game is parents talking about -- can parents give Edublocks to their kids and how early do we start earning Edublocks? What skill is too basic to get an Edublock for them that that was really interesting?

What kind of Edublocks you might learn -- earn by traveling? And what -- how could we value the education that happens in our real lives when we go out and have adventures and explore? And you can think of maybe these are positive changes or negative changes.

So, I want to thank you for playing some ideas and I want to encourage you to go on the site and look that we have -- we've over 11,000 ideas and -- and the game will

be live continuing for the rest of the summer. If you know folks who might like to watch this scenario video and share their imagination.

So, what I want to end with today. First of all it's a reminder that you are now super empowered hopeful individuals, which is our term for people who have activated this imagination network neurologically around a particular future.

You are all now super empowered hopeful individuals around the possible future of blockchain technology intersecting with higher education. So, what should happen next? Well, please keep looking for clues from this future. Whenever you see the word blockchain or ledgers you have practiced a form of imagination that will make it easier for you to be creative when you think about these new technologies to be optimistic about these futures and to imagine yourself actually using these technologies to change the world.

And it will not be hard for you to keep looking for clues of this future, I just went online this weekend to look for the latest headlines around this, and you know, we've got the IMF doing Bitcoin stuff. We've got Skype founder who is going to save the world using blockchain technology, Finnish cities are going to do blockchain powered shipping, we're going to eliminate corruption with blockchain technology, all the start ups to watch. Intel is going to do blockchain code for something called a hyper ledger. Governments are doing it. You can go on Twitter and just look for people talking about blockchain.

And you can also look for more clues in this future at the ACT Foundation website which is actfdn.org where we have a map where we've collected a lot of these clues.

If the future of higher education is not your thing you can still please keep practicing these three what if, skills. Do the simple things that we practiced together, remembering the future, predicting the past and trying to feel hard empathy. And please remember that to create something new to make a change in the world you have

to be able to imagine how things can be different and that's really the skill that we've been talking about today; how to imagine things that are different from what you've directly experienced yourself.

The future is a place where everything can be different, which is why I love to think about the future. But as we've seen thanks to the neuroscientific research the past is a place where everything can be different if we practice predicting the past in counterfactual memories.

And other people's lives can also be a place where everything is different if we practice hard empathy. We can think about the future, we can think about the past and we can think about other people and all of these things will increase our ability to be more creative, inventive, innovative and make a change in the world.

The look of alarm on my face that you may have just seen is I see that the font is not embedded properly for the next slide, which is terrible.

But I wanted to close by revisiting Lewis Carroll and a quote that really makes me excited about thinking about the future. "One day Alice came to a fork in the road and so a Cheshire cat in a tree. 'Which road do I take,' she asked. 'Where do you want to go?' is his response. 'I don't know,' Alice answered. Then said the cat, 'It doesn't matter what path you take.'

Now, originally I wanted to end this talk on the slide but some of my colleague said "No, wait that's kind of a depressing slide you cannot end on that slide."

Even though when I think about this I think this is great, this explains why we think about the future. We have to imagine where all of the past could go and only then do we know which path we want to take. We have to imagine the different futures and imagine all of the different ways things could be different. Imagine all of the possibilities and only then will we know which path to take, we'll have an answer for the Cheshire cat.

But I think let's end by doing a little more

counterfactual thinking here and -- and use that school imagination and what if.

So, what if Lewis Carroll were a futurist? How would he have written the scene differently? I think he would have written, "One day Alice came to fork in the road and saw a Cheshire cat in a tree. 'Which road do I take?' she asked. 'Where do you want to go?' was his response. 'To a better future,' Alice answered, 'Simple,' said the cat, 'just follow the what ifs.'

Thank you. And keep playing, please. Thank you.

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