

Imagination



*Imagination is more important than knowledge
Knowledge is limited. Imagination encircles the world.
-- Albert Einstein*



The first one I am going to talk about is imagination. Imagine, no pun on the word, imagine. We do not even think about the power of imagination. How can you do biomimicry if you do not have imagination? What is imagination? Imagination is the ability all of us have, the ability to all of us have to imagine anything at all, anything, right now while speaking to you I am imagining I am standing on top of the moon.

I am sure many of you have traveled with me now. And I am imagining that I am meeting my parents from 8 years ago. I am actually imagining talking to my mother. I am very happy because she is no more and so I am very happy I am speaking to her now. I can imagine speaking to her. I can imagine my life 5 years from now, enjoying biomimicry in the midst of thousands of biomimics like you, I have been imagining.

So imagination is the ability to take your mind to travel with your mind anywhere you want to go. So, when you are solving a problem, such a big problem as the UN SDG, if you cannot imagine the most brilliant solution if you cannot visualize that the solution that you are offering is going to change the world and how it will change the world if you can imagine that, can you imagine how much of an inspiration that will be? And it is so simple.

The only thing about imagination you should remember is the context to it that is all. Just say for the next 5 minutes I will imagine living underwater. So, living underwater becomes the context that is how you control your imagination. Otherwise, imagination goes like wildfire. I will imagine living underwater. I will imagine myself having one thousand friends. I will

imagine being a biomimic. I will imagine teaching biomimicry to thousands and thousands of people that is all it is.

So it is a very short lecture, but a powerful lecture that you will never forget saying before I start my creativity journey, can I imagine my solution? Can I take my solution and travel with my solution so they can see it before I start. Many sports people do what is called visualization of their game. They can visualize the entire game in their head. So, imagination is also fun of course, I am going to show you some exercises.

(Refer Slide Time: 04:52)

Exercise - Imagination

Imagine that you could ask a paper plane to deliver a message.
What would it say? To whom would you send it?



Look at this, try and solve it. Call your friends, call your parents and tell them to solve this. Imagine you could ask a paper plane to deliver a message, what would it say? To whom would you send it to? I will send the paper plane to Shakespeare. And what will I say? I will say, Mr. Shakespeare, what was going on in your head when you wrote Hamlet, I want to know from him directly. I have already started speaking to Shakespeare, right? So that is all fun exercise, at the same time powerful exercise, but you know that you can start to imagine the solution that you want. Let us see one more exercise.

(Refer Slide Time: 05:45)

Exercise - Imagination

Imagine that you could turn into an animal or bird for a day. What will you become and why?



Imagine you could turn into an animal or a bird for a day. What will you become and why? This is a fun exercise for children. Children actually do this exercise very well. We tried it with a couple of children and a couple of schools and they just go crazy, imagining themselves like a monkey or imagining themselves like a donkey or whatever. And why? Why because they love to be one. And now that we are learning biomimicry, it is fun. It is fun to think like the animal, like the lotus leaf.

(Refer Slide Time: 06:21)

Exercise - Imagination



Think of a statue.

If it comes alive what will be the conversation between you and the statue?

Imagination, think of a statue. So, you are passing by and suddenly a statue comes alive and what would be the conversation? His statue, how are you? Hi Shiva, how are you? Imagine the conversation. Do not worry about people thinking you have gone crazy, but you are starting to use that skill. You are starting to visualize things. You are starting to see things before they

actually happen. And for instance, my friend suffered from kidney disease and she had lots of problems with dialysis.

So, I am asking my students at IIT to imagine a solution where you do not need to have dialysis in order to purify your blood. So, the minute I set that imagination in their head, they start to imagine solutions. And therefore, I want to end now, I want to stop this lecture by saying one very important thing which all of us will remember. And that is if something has not been invented in the world, it is because it has not been imagined and that is the power of imagination in the context of creativity.

Why are we not living under the water? Why, there is so much of water, we are constantly living on land and polluting the earth, why are we not living underwater? Because we have not imagined it. So start your imagination journey now. Just like the power of imagination, there is one more skill that all of us have, but we never use it, I do not know why. We use it of course, but we do not know we are using it or we never learn how to use it better or we are not taught about it in schools, colleges and all that.

I think it should be part of the curriculum. What skill am I talking about? What skill is it starts with the word C? Curiosity. We understand what is curiosity? All of us are curious about several things, we cannot stop watching a suspense movie because you want to know what will happen. But do we learn curiosity? Do we practice curiosity? That is it.

(Refer Slide Time: 09:07)

Curiosity

Curiosity is the fuel for discovery, enquiry and learning.

-- Anonymous



Curiosity is the fuel for discovery, enquiry, and learning. Being curious about an organism what does it do? Being curious about the UN SDG saying why did that UN SDG even happen? Being curious about the targets and the measures, being curious about our solutions, being curious about what are all the organisms that are solving the problem? Curiosity, so powerful, but we do not do it.

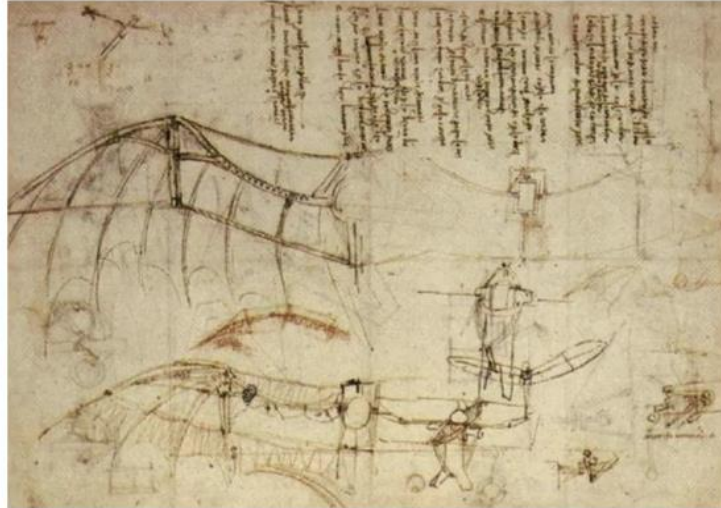
Do we allocate time saying for the next 10 minutes I am going to be curious about this whole thing. Look at this very picture. Look at the number of questions that we can ask. I did this exercise recently with my students. What we did was, but I actually surprised them. I showed them a video, showed them a video of the caddisflies, it is a lovely video of the caddisflies, just look it up. I showed them the video.

They are all waiting expecting that I am going to ask them about the video, some information about the video, what is the caddisfly and all that. At the end of the video what I said I need each one of you to ask me a question about the video and we are not used to that. So they said, what? I said ask your question about video. You have these five friends. Five interrogation friends; what, why, how, when and where, I said use it.

And they started asking, which means when you ask questions what is it? It is about being curious. You do not have to know all the answers I said, you just learn to ask questions that is all. So for instance, in this very picture what are the questions you have? Okay one question is what is the cat looking at? Because it is very dark. The other question is what material is made of?

The other is I see something like a broken door, is that broken or is it because of something else? Where is this place? Look, already 5 questions. Normally, you would have just flipped through this picture. I am saying no. I am saying let us practice curiosity by actually learning to ask questions and be curious. What is curiosity?

(Refer Slide Time: 11:35)



By Leonardo da Vinci - <http://www.drawingsofleonardo.org/>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=3559365>

Look at this picture. This picture is by Leonardo da Vinci. He is trying to make a picture of what he calls the flying machine. Five hundred years ago, he was curious as to how birds fly and he started asking questions the way we ask now and the drawing is the result of his thinking. Five hundred years ago, he imagined, so now imagination also coming. He imagined how birds fly.

He was curious about how they fly. He combined imagination and curiosity and came up with this flying machine. And today flying is such a part of our lives, but five hundred years ago he was able to ask those questions.

(Refer Slide Time: 12:34)

Curiosity - Characteristics



- Seeking Information
- Asking Questions
- Exploring Alternatives
- Seeing what is not seen
- Experiencing

What is the characteristics of curiosity? A curious person always seeks information. Always wanting to know more and more information. I want to know this, I want to know that, I want

to know this. For instance, in this case how is it that the owl is able to tilt its head so much? Why does the owl stay awake in the night? What is it that makes the owl be called as a wise bird? Why is the owl's beak so small? Why are the owl's eyes seem very small compared to the size of its face or head?

What are the different types of owls in the world? What are the different species of owls. Where are owls most found? All I am doing is seeking information. The only thing to remember is if you seek information, seek it with the relevance of what you want from the conversation, what do you want from the picture. Here if my goal is to learn about the owl, then all these questions are relevant.

If my goal is to learn about the function of that beak, then I will ask questions around the beak and not the other questions. Asking questions, we just likely said. Actually, one of the things I want to try is to make my students write an exam where they will only be asked to write questions and no answers. And I will give good marks for the people who ask the best questions. Exploring alternatives.

Now, when you are curious, you are starting to ask yourself what else can I use this for? For instance, an orange, I can ask myself what else can I use the orange for? What are the different uses for the orange? One is supposed to eat it which is the normal way. Other is to use it like a ball for juggling. The other is to use it for throwing at someone. It could be to protect yourself. It could be to make juice out of it when you are thirsty, you can drink it.

It could be to attract someone's attention. It could be to leave a trail. You can take quite small pieces of orange and keep leaving a trail so that people who want to find you can find you easily. Look, I already have 6 uses for Orange. So, curiosity is very useful for exploring alternatives, other ways of doing things. So many times, things are hidden from us, we do not really see those things. So, curiosity, asking questions helps us see what we cannot see.

When you experience, curiosity is also about experiencing, for instance the suspense movie I said, when you are curious, you actually become the detective in the movie and experience the pain of not being able to find the person who killed, who murdered.

(Refer Slide Time: 16:08)

Dimensions of Curiosity



Reference: curiosity.merckgroup.com

There are four dimensions of curiosity. I will quickly explain what they are. I think what you should do is look and see the website for instance, Merck group.com, you go to the website and learn it yourself. I am just introducing curiosity to you so that you know that there is something called curiosity and you start to practice curiosity more and more. So, what are the dimensions of curiosity, four dimensions.

One is joyous exploration, getting pleasure from exploration. So therefore, curiosity for the sake of curiosity, I want to know that is all, there is no reason to know. I just want to know how the remote works. I want to know how this laptop works. I want to know who is occupying that house. Just I want to know for the sake of knowing. Deprivation sensitivity, recognise the gap in the knowledge and seek answers.

This is exactly what I said about the detective movie, the murder mystery. You, do not want to be deprived of information. You want the information? You do not want any gap in your information, therefore curiosity, a brilliant one. I think most of us are curious because of this. You want to know, where did you go, when will you come back? You want to fill up all the blanks all the time. Openness to people's ideas, valuing diverse ideas of others and so, curious as to what you think.

I am supporting this view, what view are you supporting? What is your opinion about this? Without having to make a judgment on them simply to find out what other people think, what is their mental models? I am just learning this beautiful subject called mental models I hope I

have a chance to talk to you about it. A mental model is looking at the world from your point of view all of us are mental models.

So, if I am for or against something it is because of my mental model. If you are for or against something is because of your mental model. And if the two of us are in conflict is because the mental models are in conflict. And the use of mental models, I can learn from your mental models this is why you think of that like that. So, openness to other people's ideas, looking at the perceptions of other people.

How is it that you are looking at the problem that I am looking at? Both of us are looking at it differently. And finally, stress tolerance, willingness to embrace the anxiety and discomfort. So therefore, curiosity is also what embracing discomfort. Because when you are curious, you want the answer immediately. And when you asking questions, it means you do not know the answer. So being in a state of not knowing being comfortable with that is also one of the dimensions.

Most of us are not curious because we are scared of being in that zone of not knowing. But I am saying it is fun. So, I know there is anxiety in not knowing, but embrace that anxiety and stay with that anxiety and say okay if I do not get the answer, I do not get the answer. Sometimes, remember when we are talking, we have that word which is there at the tip of our tongue, but we are not able to express it, huge stress we go through.

It is similar to that but more and more it is about the ability to embrace, embrace anxiety of not knowing something and discomfort and all that. So, these are the four dimensions of curiosity just to help you understand this brilliant tool. Only problem is you need to practice it. Of course, people will be irritated by your new style of asking questions, but that does not matter. Most of the things we do, we do for ourselves to improve our own skills.

And if you can only put the context to asking questions, they are saying, I am asking questions for this purpose. If you put a purpose to asking questions, you are going to have fun, you are going to start becoming a person who is seeking answers, instead of simply being a person who is simply knowing or getting answers. What is the fun in that? So therefore imagination, curiosity; two important tools for being biomimic for continuing your biomimicry journey.