

Introduction to Biomimicry
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Lecture - 06
How to Do Biomimicry?

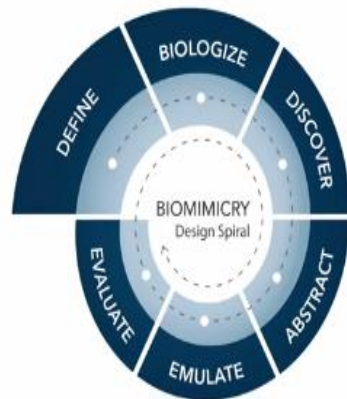
In the next few minutes, you are going to learn something critical to this whole program. I do not know how to even bring in the importance of the next 10 minutes. You can see that I am trying to, you know, find out what is the best way to impress all of you who are listening to this and say maybe the next 10 minutes is the most important 10 minutes of this entire eight-week session.

You know, it is nice to know about biomimicry. It is nice to know that nature is a great inventor. It is nice to know that you can be inspired by nature. It is nice to know why biomimicry. But at some point in time, we will have to know how to actually do biomimicry. We learned that biomimicry offers solutions, right? So, if biomimicry offers solutions, then we must be ready to solve problems.

Because without problems, you cannot have solutions. Now, therefore, one of the attitudes that we will have is that we will embrace problems, we will start to what is called fall in love with problems. Now after we have fallen in love with a problem, and after we have said this is the problem I want to solve.

And if we want to be inspired by nature, if we want to solve problems the way nature solves those problems, but how do we do it? That is the question, right? So, I am going to show you a picture, I am going to show you a picture, which is going to be imprinted in your mind and heart for the rest of the program and maybe for the rest of your life.

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So, the picture I am going to show you is of the biomimicry process. Look at this picture, so beautiful, right? So clear, and so nice. And many of you may be tempted to actually put this as the photograph on your WhatsApp. So this is the biomimicry process, which helps you to go from problem which is contained in the define to evaluate which is the final solution.

And in between 'define' and 'evaluate', there are certain steps. Now many of the student projects that you will see, all the students would have used these steps. The magic of this process is that when you start the biomimicry program, as of as in right now, all of you are not very aware of how to go about this whole thing.

But the magic of the process is that if you follow the process in a disciplined manner if you trust the process that is what process requires, right? Whether it is the creativity process or the manufacturing process, or the recruitment process, any process requires discipline, and trust in the process. You need to follow the process in a very disciplined way.

Maybe some of you in the future will come out with a new process. That does not matter. For the moment this is the process we have. And this process will teach you to go from one problem, from the problem to the solution. And in between, there are certain steps. So, I am just going to quickly let you read the processes, the steps, which are defined automatically, which means that you define something you define a problem.

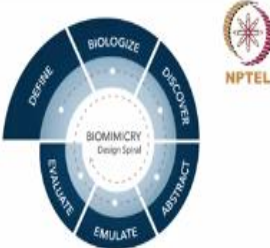
Biologize is the life-changing word here. And then discover, abstract, emulate, and evaluate. This is also called the biomimicry design spiral, right? Now I can leave you here and in suspense saying you know what this is, but I can also go ahead and start to explain it a little more. You are going to be dealing with this, you are going to be seeing this, looking at this ad nauseam.

But that is what it is because it is magical, right? It lets you start with nothing and end up with a solution. And if you are patient enough, by the end of this session, you would have found out that one of the students will actually use the process and come back with a beautiful solution, right? Okay, now I am going to explain the process step by step. Just pay attention, please.

Because if you pay attention now, it will be easier for you to go through this whole program in a very easy, enjoyable sort of manner.

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The Biomimicry Process



DEFINE - the Challenge
– What is the problem that I wish to address?


BIOLOGIZE - Function and Context
– How does nature accomplish what I wish to address?

DISCOVER - Biological Strategies
– What organisms (or systems) perform the same function that I am trying to address?

ABSTRACT - Design Strategies
– How do I translate the biological strategy to a design strategy?

EMULATE - Nature's Lessons
– How do I apply the bio-inspired strategy into the problem that I am trying to address?

EVALUATE - Fit and Functionality
– How can the solution be deployed in the real world? What are the barriers and constraints?



So, these are the steps. So, all I am doing is relating the steps, and giving you a one-line explanation of the steps. I am not going to go deep into it right now, because we will be doing it several times over the next few weeks. So, the first is, what is the challenge? What is the challenge I have? You know, even in entrepreneurship when I learned entrepreneurship about three years ago, the first thing I learned was to identify the problem.

In design thinking, the first thing you learn is to identify the problem. Similarly, in biomimicry for using the spiral, you start by saying, what is the problem I want to address? What is the problem I have? What is the problem that I want to solve? Is the Define. Very simple. We will teach you later on in a very detailed way how you actually arrive at the problem.

There are several ways to look for what is called the real problem. You can start with a large problem and go on to a real problem. But that is not the teaching now, that is not what you need to learn now. Right now, you need to simply understand what is define. Define is what is the problem I want to solve. Now the next one, you can see me smiling, right? Because I was waiting to come to this one.

The next one is biologize. I frankly did not even know this word existed before I learned biomimicry, frankly. I do not even know how well, I do not even know how the person who coined it into a verb right, biology biologize, right? Biology is the noun and biologize is the verb. So biologize. See what it means. It means how does nature accomplish what I wish to address?

So again, I am not going to go deep into this. Once you have identified the problem, that I want to keep my fabric clean, I want to keep clothes clean, if that is what you have identified as a problem, the next question you ask is biologize, which is how does nature keep fabric clean? You know, a life-changing question. A life-changing question, because remember we said why biomimicry, we said we change perspective.

And this is the word that changes your perspective, changes your life. Because the minute you have a problem, you can ask how does nature solve the problem? How does nature address the problem? I want to build a team? How does nature build teams? I want to regulate temperature. How does nature regulate temperature? So how does nature accomplish this?

How does nature address the problems that I want to address, which means the problems that I want to address and the problems that nature wants to address is the same is biologize. It is a life-changing word. Biologize, remember to biologize means how does

nature accomplish what I want to address? And then you look at discover. Discover is what it means.

Look for the organisms that perform the same function that I am trying to address. I want to regulate temperature, what are those organisms that regulate temperature? So the interrogation here is what are those organisms, right? Where are those organisms? So, 'discover' is looking for finding out which organisms in nature that accomplish or are trying to solve the same function that I am trying to solve.

So, discover is you will be introduced to a world of discovery, to lots and lots and lots of organisms. You will have to identify what are those organisms that accomplish the function or perform the function that you want to address, right? So, it is clear now, right? Define what is the problem I want to solve. Biologize how nature solves the problem.

Discover what are the organisms in nature that solve that problem. Abstract is how do I translate the biological strategy to design strategy. It sounds complicated, it is not. Nature has a strategy, right? The lotus leaf has a strategy. The lotus leaf has small microstructures, we learned that, and then the microstructures the water does not stay on the lotus leaf. The water is washed away, we learned all that.

We will learn all that. Now that is a biological strategy. That is what the lotus leaf does. Now how do I understand that strategy? In simple words, without using any biology, biology language, right? How do I draw a picture of the entire process that the lotus leaf adopts?

How do I make it very simple, taking away all the jargon and simply drawing a surface on which water is washed away with small microstructures there? If I can understand it in a very simple way. So 'abstract' is understanding the biological strategy, in a very simple way. Is one of the most exciting things you will do in your process. Just watch out. So beautiful it will be. It is really fantastic.

Because it helps you ask yourself, what is it really that nature is doing for this strategy? And then abstracting that strategy. And then 'emulate' is how do I, emulate is the

ideation phase, right? So, I know that the lotus leaf is employing this strategy. And I understand what it is doing. Emulate means, what are the ideas I have? What are the new ideas I have to adopt this strategy?

How can I be inspired by the strategy? How can I actually be inspired by the strategy in order to make, in order to look for a solution? So 'emulate' is a very individual effort. Each one of us will look at the same strategy, but we will come out with different ideas. And finally, 'evaluate' is how can the solution be deployed in the real world. What is it? So it is not enough just simply to have a solution, right?

It is also the problems and the solution. How do I get over the problems? What are the barriers about the problems? What are the constraints? And how do I fulfill the design principles of nature? How do I evaluate my idea against the design principles of nature? So, therefore, what you have are 1, 2, 3, 4, 5, and 6 steps. Define is what is the problem I want to solve.

Biologize is how does nature solve that problem. Discover is what are the organisms in nature that solve that problem. Abstract is how do I translate in a simple method, in a simple language, the biological strategy of nature. Emulate is what are the ideas I have. What are the ideas I have. What is the inspiration I have by looking at the strategy. What are the new solutions that come to my mind and evaluate this.

How do I evaluate my ideas? How do I tailor my ideas? How do I look at the problems in my ideas and try and find out if I can come back with a solution that addresses those problems? How do I evaluate my ideas against the design principles of nature?

So finally, what we are really saying is that from just simply having a problem to solve, which is again an attitude that we had developed, that the attitude of saying, I want to solve problems, to following the process in a very disciplined way and coming back with a solution that is elegant and that is very much inspired by nature.

Of course, whenever you look at a process, you also remember that all processes are iterative, which means that you can keep going back and forth. If for instance, you do not, you are not very happy with your 'emulate' idea for instance, then you can go back

to finding out if there is some other organism you can be inspired by. You probably have defined the problem in a different way.

You can also ask yourself, if there is a better way to define the problem. Maybe you are not asked the right questions of nature. Maybe the abstract is a little more, you have to work a little harder on the abstract. So you keep on going, you know, up and down. You can keep on iterating in order to come back with the solution that you are satisfied with.

And therefore, this is going to be the heart of this program, the biomimicry spiral, right? And therefore, if you really look at it, it is very logical. The only surprise here, the only bonus for each of us here is the word biologize. That is my favorite, right? I do not know how many of you are going to have favorites in this. But let us see at the end of the program, if everything in this spiral is your favorite.

If one is your favorite, if all is your favorite, etc. But remember, the spiral is going to keep on coming to us. Because everything that we do in this program will be around solving a problem being inspired by nature.