Introduction to Biomimicry
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Lecture – 23
Step 6 – Evaluate Feasibility:
The Biomimicry Design Spiral

So we now come to the final part of the spiral, which is 'evaluate'. Now I am especially elated about 'evaluate' because 'evaluate' as the word suggests tells you to look at your idea from a finality point of view, shape the idea. So now what is evaluate? You know what is evaluate, you know to test something but it is not so easy as that at the same time.

Remember, I used the word deliberate at one point of time, when you say deliberate creativity means planning your creativity. So can you start to understand how challenging, how much fun, at the same time how much hard work creativity is. Because creativity, I am hoping that all of us have started to understand creativity is not just about generating ideas. It is so easy to generate ideas. But it is not all. You cannot create an entire institution only with an idea.

An idea needs to be implemented. Before implementation, it needs to be evaluated, it needs to be tested. So for the next 10 to 15 minutes, we will be speaking about evaluating the solution. Please pay attention please because this is going to be useful to you not only for biomimicry, but for almost everything that you design in your life.

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So evaluate means how can my solution be applied in the real world? Now, this is what it is all about. It is all about you can do whatever you want in your workplace or on your laptop, but ultimately if you want to really use creativity, you must use it in the real world and that is what you get paid for. How can you use your ideas in the real world? What are the barriers and the constraints?

Once you know what are the problems and the constraints about your idea, you can start to look after those constraints and barriers. Before that, therefore you must not very attached to your idea right now, many people are so attached to their ideas that they are blind to the barriers and constraints. You cannot be doing that. Because for you it is not about being in love with your ideas. It is about making your ideas work. Look at this now.

I have about 5 or 6 slides, all of which are questions. And these questions are powerful because these questions help you evaluate your idea. So, look at the question number 1. How well does it meet the criteria and constraints that you identified during define? So during define, you say these are the things, the context, this is the constraint, how well does your final solution meet that constraint you must ask yourself that question.

Look at your define, look at what you did in define, look at your solutions, find out if they match. How well does it meet nature's design? These are the two important things. Nature's design principles, you are going to be learning in the next two classes about the nature's design principles where nature designs, the way nature designs, and therefore the nature has those 10 design principles.

Are you looking after nature's design principles when you are designing or are you simply making something that is going to destroy nature? You do not want to do that, right? Revisit the earlier steps of this, so it iterates. For instance, when you are coming to evaluate and you find that you need to look at one more organism, go and look at one more organism and that is what is called iteration. Also, look at the technical feasibility.

If your idea is so futuristic that it cannot happen over the next 100 years, then it is not a good idea to do it right now. So, look at the technical feasibility, look at the business model. Find out if the idea is feasible from a business model point of view. Find out if it is going to be

accepted as a business model at all. What are the environmental problems with the idea? If your idea is going to cause huge environmental damage, it is not a good idea.

What is the social impact? Will it be accepted socially? Will people be able to accept it easily? Is there a cultural problem with the idea that people will not accept it? So, these are the things you do to evaluate.

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Evaluate is shown as the last step. But several times you have to have evaluate and you have to have what is called an evaluating mind all the time, like a monitor. right? A monitor in a classroom, what does she do. She constantly monitors the class. So, 'evaluate' can be your monitor. From when you are doing all the processes, keep 'evaluate' at the back of your mind so that it is not a judge of your ideas, remember you do not judge your ideas. It is simply that you test your idea, tell yourself that you need to test your idea. So, over a period of time, at some point of time, you will have to test your idea, prototype your idea, get feedback from the users and all that.

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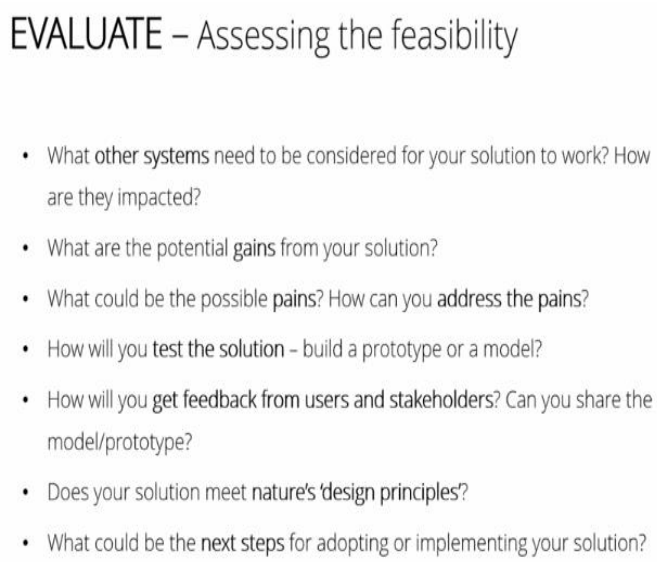

So now, we are talking about the feasibility of the idea. How do you assess the feasibility? The feasibility means, can the idea work? What does it take to make the idea work? Feasibility would be what would be the potential gains from your idea? What would be the potential gains? What are the other systems that you need to interact with? For instance, the governmental system, the social system, international society whatever system.

So, what are the other systems that your idea will have to interact with? What are the potential gains from your solutions? What is it that people will gain, society will gain, and technology will gain from your ideas? What are the possible pains? What are the problems with your idea? We will come to each of these in detail as we go along. How do you test the solution? Will you make a small prototype? Will you build a model?

Will you write a prototype on a piece of paper and show it? How will you actually test the prototype, test the solution? How will you get feedback from users? For instance, your idea will have to be used by people. If you make fabric from the lotus leaf technology, from the way the lotus leaf washes away dirt, if you make fabric from that, it is a great idea. But how will you get feedback? Will people actually use it?

Will people actually use that fabric? What will prevent them from using it? What will excite them about that product? So, getting user feedback is one of the main things in entrepreneurship. When we teach entrepreneurship, what do we do? We say entrepreneurship is not just your great idea, it is also about getting user feedback. Actually, in one of the

programs that we did, we recommended that you meet 100 customers before you actually say this is a good idea, 100 customers.

Out of 100 customers, if 70 or 80 customers say it is a very good idea, then there is a chance for your idea to succeed. Because many times we make ideas, make solutions without bothering about what the customer really wants. And there is a huge mismatch about the solution that you have and what the customer really wants. Does the solution meet nature's design principles?

Keep on coming back to that because nature's design principles, those 10 principles are at the heart of design. Because when nature makes design, she sees to it that she does not harm the environment. What is the use of doing biomimicry when your design is actually going to cause harm to the environment? So, now we are going to look at each of those feasibility points in detail.

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So how do you assess the need? Is there a need at all for this design or is it so futuristic or so nonrelevant that there is no need for this design? How does the idea impact stakeholders? Who are the stakeholders of the idea? There are several stakeholders. For instance, if you are building a road, there are so many stakeholders. There is the village through which the road is going. There is the contractor, there is a government, there are rules, there are motorists.

There are so many stakeholders. So, when you are making the road, you need to consider the needs of all the stakeholders. You cannot just build a road through a village and say this is

my road, this is how I build it. So how does it impact different stakeholders? First and foremost, who are the stakeholders? How are the stakeholders going to react to this new idea? Some of them may reject the idea totally.

Some of them say no, it does not fit our cultural context. Do not be disheartened by this. It is not as if your idea will not work. I am just saying that if your idea really has to work, these are all the things that you must consider. Because many times, we are so quick with our ideas that we do not consider this and later on we blame ourselves and we blame the system saying nobody is listening to my ideas. That is not the way you go about it.

You have to do a thorough job of your ideas in 'evaluate'. What will take for the stakeholders to accept me idea? So, if I listen to the stakeholders, stakeholders may say you know what if this road cannot go through that particular path in the village, you can deviate the road a little bit, will be nice for us. And what have they done? They have accepted your idea of the road in the village, but they are saying please make some changes.

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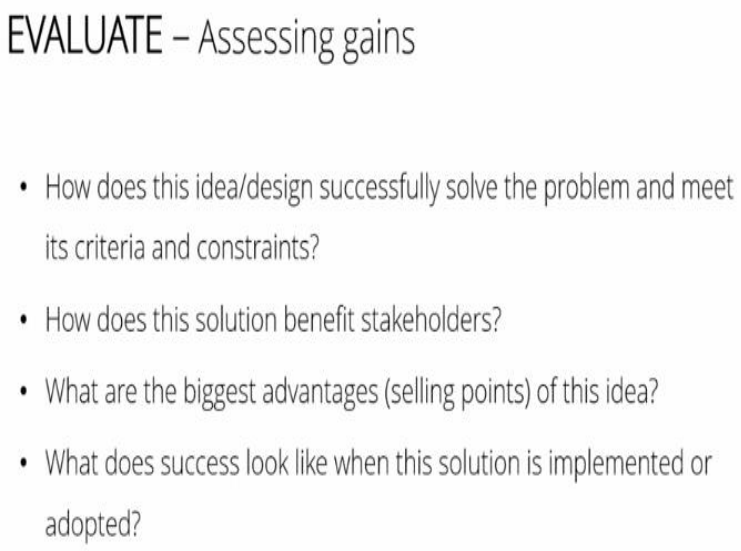

Gains, what is the meaning of gain? Again, it is something that makes the customer happy, makes the person happy. So, what is the gain? What is it that you can give by way of gain to the person who is going to use your idea? How does the idea successfully solve the problem of that person? So, go back to the fabric problem. How does it solve the problem? Maybe the mother or the person who is washing the clothes will say wow, it is a nice gain for me.

I do not have to wash my children's clothes every day, so that is a gain for her. How does this solution benefit stakeholders? What is the biggest advantage of this idea? Sometimes what happens is the big benefit of an idea overshadows all the small problems about the idea. So, is there a huge benefit in this idea that you can use in order to make the other idea, other problems seem smaller?

What does success look like? This is a great visualization exercise. So can you visualize your idea and everybody is applauding your idea, what is it? What is it looked like when it is implemented? So, assessing gains.

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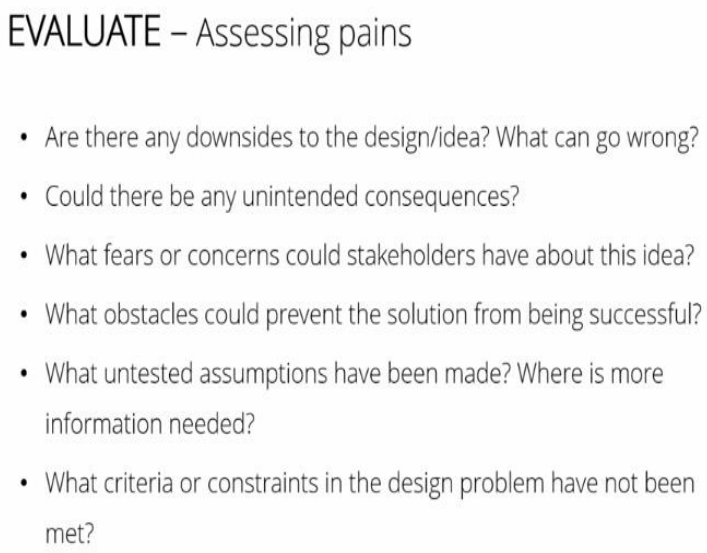

What are the paints? Look at the details. Look at the details, you do not have to do it right away. It is important, it is a reference slide for you. It is a reference slide for you when you are doing that big task, when you are talking, when you are making this big presentation of your idea. When your idea is going to be assessed by a lot of people, there is a lot of stakes involved. That is the time you reference this slide.

And that is the time you will be grateful that this slide is there because this slide is so comprehensive. These slides are so comprehensive that they help you flush out your idea completely. Are there any downsides to the idea? What can go wrong with your ideas? Is there any unintended consequence? You know the meaning of unintended consequence. An unintended consequence means a consequence that you never expected to happen.

And there is a very beautiful systems thinking habit called looking at unintended consequences, short term, long term unintended consequences. What are the fears of stakeholders? So, supposing you make this fabric designed after the lotus leaf what are the fears? Is it going to be too expensive? Will the dirt still be sticking in the cloth and so will it cause an infection to the person wearing it? What obstacles could be prevented?

What are the problems with the idea? What could prevent the obstacle could be a competitor to make your ideas successful? Could be cost, right? What untested assumptions? What have you not tested yet? And what are the constraints that you have not met yet? So, these are assessing the pains.

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Assessing gains, assessing pain, and then how you address the pains. Once you have assessed the pains, once you looked at all the pains you have to address the pains. So, ask yourself: is this pain a real pain or simply some fear, some emotional fear? Is there any way that you can prevent this pain at all? How can you make this pain into a game? How can you turn the pain around and make it into a game? And which stakeholders or experts can we talk to? Sometimes what happens when we create an idea, we do not have enough expertise in the idea, so whom can we speak to?

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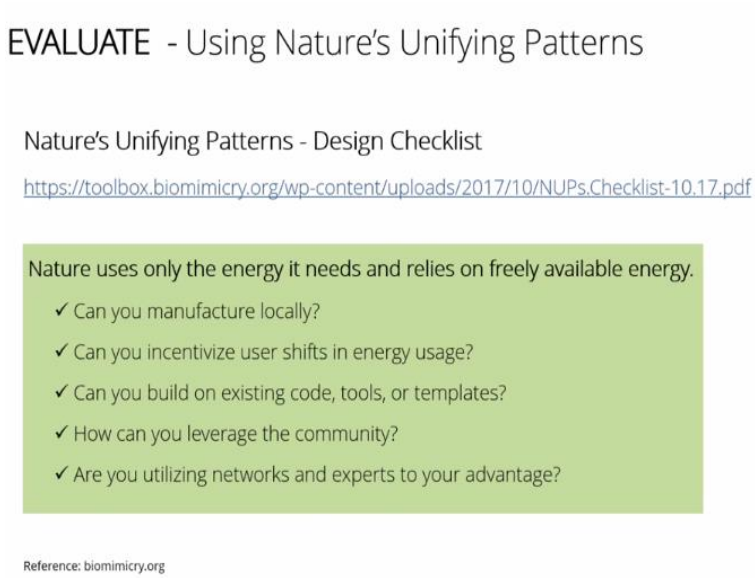

Now we have something called a checklist, which is called the Nature's Unifying patterns Design checklist. You can look at that link. I am just going to give you a sample of it. The sample is, look at this, what is this? Nature uses only the energy it needs and relies on freely available energy. It is one of the design principles and the checklists. Supposing you are making some design, you are making the fabric, you evaluate your design against this checklist.

This checklist is available in that link. I am just giving you a sample. The sample is one of the principles that nature uses only the energy it needs and relies on freely available energy. So, what are the things that you need to look out for? Can you manufacture locally? Yes, or no? Yes. Because it relates to nature uses only the energy. Can you incentivize user shifts? Can you incentivize? Yes, or no? Yes?

Can you build on existing code, tools, or templates so that you do not waste too much energy? Yes, or no? Yes. Can you leverage the community? Can you help the community grow? Can you make use of the community? Yes. Are you utilizing networks and experts to advantage? Yes, or no? Yes. So, these are the checklists for the idea. So, keep your idea in front of you, keep nature's unifying pattern in front of you, and use the checklist to evaluate your idea against the unifying patterns of nature.

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So, identify the next steps. This slide talks about the steps you will take, for instance, what is the meaning of next steps? What are the things that you will do? So, you will probably speak to some experts. So, you will say I will speak to the following experts, next step. Then you will say I will do the prototyping, then you identify a lab for the prototyping, you will find out how much it costs, and then you will actually do the prototyping or model.

Some of you may want to file an IP. So, therefore you will visit the local IP office and find out how to file an IP. Some of you may want to give this idea to a group of entrepreneurs to develop the idea. Whatever it is, identify the next steps. Once you have done all the evaluation, identify your next step is what we are talking about. Do not simply rest on your laurels and say I have created the idea that is not enough because we want your ideas.

After you have done the evaluation, it would be a complete waste of time if you are going to keep the idea locked up in a cupboard. Your idea has to see the light of day, people will have to come and use your idea. You may want to make some money with that idea. So, therefore it is important to identify, I have done all the processes that I have learned. I have done all the steps in the biomimicry spiral. I have evaluated the idea completely.

Yes, there are one or two problems with the idea but that is okay and this is my final idea. Now, these are the next steps. So having the confidence that your idea is going to work and your idea is going to solve, the whole point is the United Nations Sustainable Development Goals, the problem that you came out with. I have used, I have been inspired by nature and I have used the technology, the strategies of nature. I have done all this work.

After doing all this work, I do not want to lock it up in a cupboard, I want to have the next steps. And the next steps could determine how powerful, how wonderful, and useful your idea can be.