

**Design, Technology and Innovation**  
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**Lecture-15**  
**Learning's from Grassroots Innovation**

The context in which the content of our learning takes place, we spend a lot of time on what we do, but the context in which it is done and the context in which people may use what we do is some time more important than what we are doing. So, you have a line here and you are to shorten it without rubbing it. Do you know the answer? You draw a bigger line. Now, here begins the context of my story today.

So what has got changed here? The context. What did it change? The content. The same line became smaller. So, what are we trying to do? We are trying to change the context in which designers choose the problem and try to solve them, address them, scientists pick up a problem and do research on it. But very often or many times the context in which these solutions are going to be used, if it succeeds, is not as apparent as it should be.

So how do we do that? So one of the ways in which we try to address this problem for my own learning and learning of colleagues in the Honey Bee networks was to walk in different parts of the country. So the concept of voluntary suffering is very fundamental to what Honey Bee network does. When I try to find a solution which is addressing my own problem, I am not doing any favour to anybody, I am not doing any obligation to anybody else. That becomes *Samvedan Shilta* or empathetic innovations.

And empathy which is not equivalent to *samvedna* because *samvedna* is within, empathy is for others, helps us to identify those problems, those pain points which otherwise you might ignore, because they may not affect our life. So we have been giving Voice, Visibility and Velocity to the ideas of common people. If they could do so much for their own efforts, they could do much more with our sharing, joining hands with them. If people who do not have much material resources have to survive, what would you do? What will they maximize?

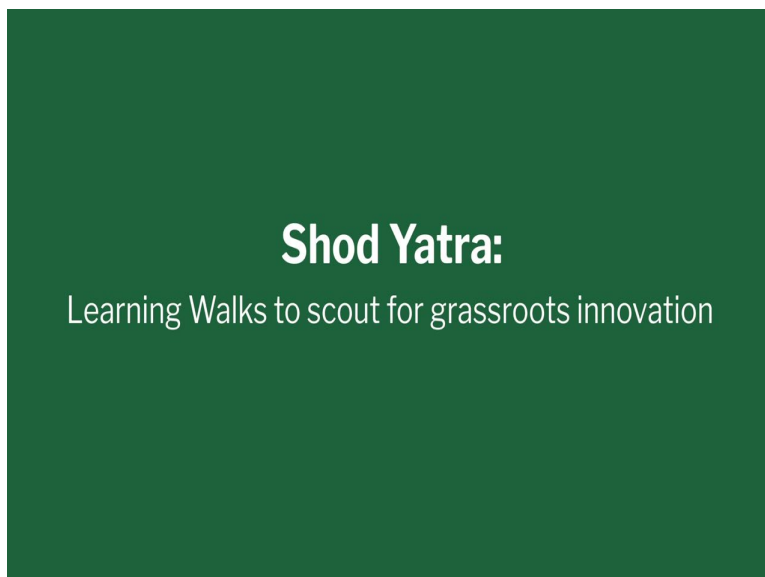
They do not have much material sources, so they will maximize their metal resources: Imagination, experimentation, innovation. So, innovation is imperative for them, they do not have choice.

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So we will discuss today first about 10 teachers from whom we learnt over the years through various processes of *Shod Yatra*.

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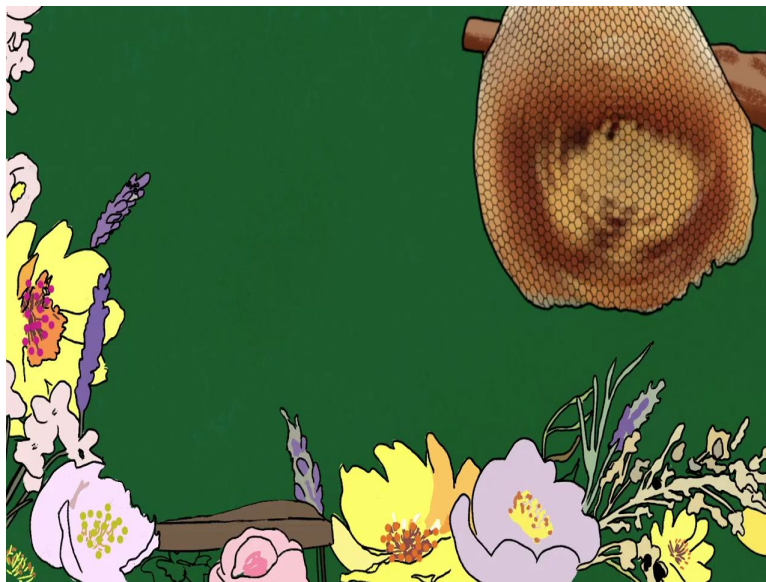
And these 10 teachers are accessible to each one of us. You do not have to come to me to find these 10 teachers.

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The reason why we call it the Honey Bee network is because honeybee does what we don't do. What intellectuals like us do not do.

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Honey bees cross pollinate. The idea to connect ideas of 1 with another. When they take nectar away, the flowers do not complain. And don't keep all the honey with themselves. They share some with us. So when we take knowledge of people do we acknowledge them? Do they become co authors when the reports and publications? All the 1050 patents filed by the National Information Foundation are on the name of the innovators, not one of them has the co-inventorship of the staff or the scientist who have worked on them.

We said ok, when we write papers we can become co-author. Put the innovator and your name together. We do not mind that, but intellectual property rights, that will remain of that person. So the asymmetry that exists between knowledge producer and provider in the informal sector and knowledge producer and provider in the formal sector, we have tried to bridge that gap.


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When do great institutions, cultures and civilizations start declining?

One of the questions that bothered me is that many great civilizations sometimes decline.

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When this happens, creative people stop talking about their new ideas openly, they keep to themselves and often don't even own their ideas boldly. Such a sign is an indication that the specific society, institutions, organizations and social groups have started courting inertia instead of innovations.

And they decline because they do not communicate much, they do not share much. They become self-contained. A professor does not talk to the next professor the next door. The student does not talk to the student in the dorm. They just become secretive. The more secretive you become, the

less feedback you get. It is only the criticism from the peers and from colleagues who know about our subject only can ask some strange questions which help our ideas to grow.

So, how do we create that culture of sharing and building upon shared ideas, that was one of the concerns that had.

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How do we create turbulence of technological, institutional, educational and cultural creativity and innovation?

Because we did not want our society to decline. And how to do that?

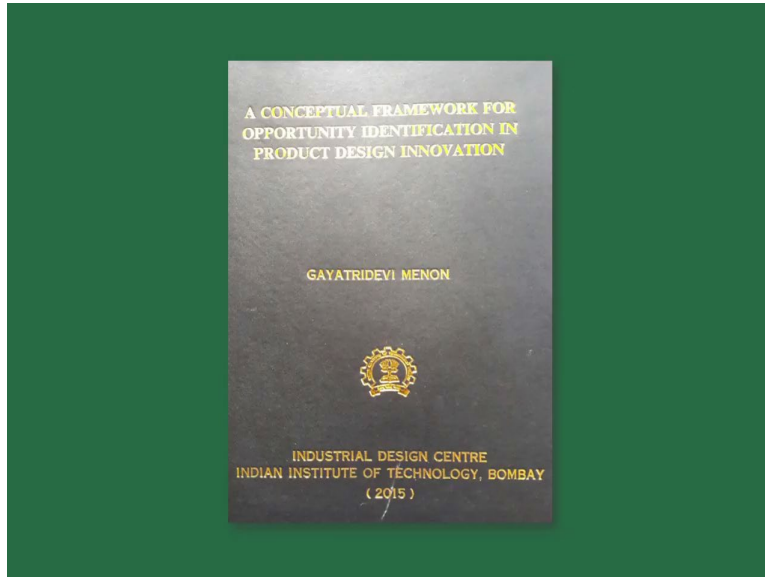
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The Honey Bee Network has been looking for creative people worldwide

So we realised that we are looking for creative people. Creative people are everywhere. Just outside of IIT Bombay, there is a person who often binds your thesis. Black cover thesis. And you know there is embossing done on that.

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Title of the thesis in golden colour. He designed a printer for embossing your thesis covers which will print whichever film you use, he will print with that colour and we thought he deserved to be recognized. He may not have studied much, he may not have been educated much but had creativity to design something. Outside the boundary of IIT. There are creative people all over. No matter which place we went, we have found creative people. In *Bargarh*, a district of *Orissa*, when we had a *Shod Yatra* there in summer. Very hot place.

Said to be a poor place, of poor people, but people may be poor economically but they are not poor in their mind.

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## Mind on the margin are not marginal Minds

That was my subtitle of my book in 2016: Mind on the margin are not marginal minds. So this person had designed a loom where he wove a kurtha in a cylindrical manner all of it. Imagine the complexity of this task, as an engineer, as a designer. Just think of the complexity. Why would he do that? Not everybody stitches that. I have to do something different. I have to do something better. This desire to be different motivates this couple to design something that was unthinkable. Now our horizon has expanded. Now we can think of that. In sweater it was easier, because with this knitting you could do that, but in weaving? That was the first time.

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Mapping creativity, tapping innovations &  
capping inertia

So, what are we trying to do? We are mapping creativity, we are tapping the innovations of the people who are solving problems innovatively and we want to cap the inertia. Some inertia is

inevitable of course we cannot change everything all the time. But some of the inertia in our society has been for too long.

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You have seen hand pumps. So if you have to drink water, what do you have to do with the hand pump? Single, you are alone.

Student: You pump and as soon as the water comes out you cup your hands and you fill it.

Sir: Then what happens?

Student: Then you have to keep repeating it.

Sir: Then you go back and some water spills over on the web in the time that you went there. We have so much water to waste? So what should be the design? He is saying you bring a pipe closer to handle? What else can we do? Quickly just tell me. Look at that first issue I told you is less material.

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## Minimum material & Maximum efficiency

We want Minimum material and Maximum efficiency. So this is the handle, how will you take it? This side? Correct? Pump it, drink it.

Student: Sir we can make the pipe the handle so we just pull down the pipe.

Sir: When you pull the pipe done, if you push it down, as a pump, you need much more pressure. It is a lever. Why are we using this long bar? To use it as a lever, you know. You know what lever does.

Student: Sir, if we make the pipe longer we inherently save material.

Sir: Now we have not added any extra material in this design solution.

Student: That way we will be removing material.

Sir: No we have just put this handle this side.

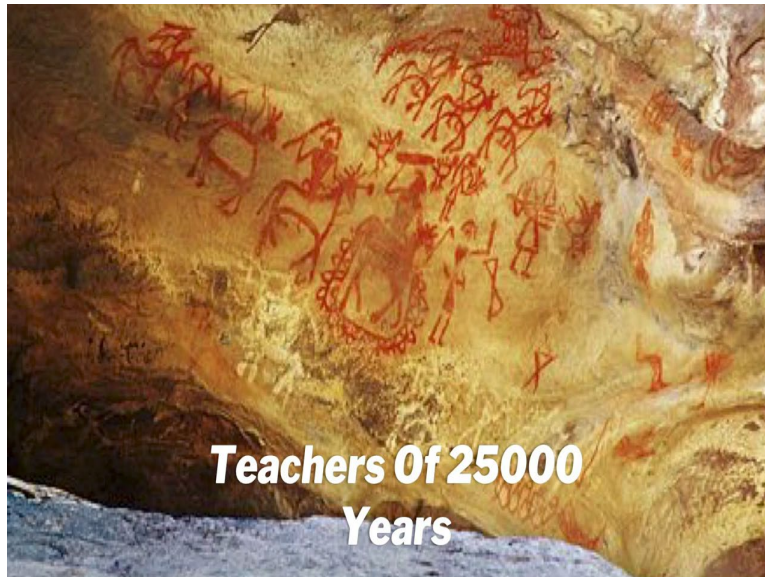
Student: I said if we could make the pipe longer.

Sir: No, but the question is: if I do not use anything extra.

First attempt is minimise use of extra material. If possible, reduce some. Because material creates entropy, correct? The question is for such a long time, for millions of hand pumps we continue to bear and live with inefficient design. Why is our society so tolerant of inertia and inefficiency? So, what happened then? Somehow we reduced the expectation from ourselves. We think our life is less precious. We think we matter less.

We do not deserve an efficient service or design. It is ok if as Indian I can live with inefficiency. Because we have somehow been taught to accept. We are a conformist society, we are a congruent society, we are a complaints society. We do not question enough. Every innovation is a response to a question.

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Now, I will show me some teachers from whom I have learnt and I am sure you can also learn. Teachers of 25000 years. You know, where this cave painting is? There is a place in Central India, *Bhimbetka*. 25000 years ago a design teacher was teaching us and at that time there was no language, there was no community, there was no simulation. It is all about 10000 year old. And the teacher is telling us, 'Ok, take 2 lines, make a cross, 1 line, make a double cross and the double line, put a head there, circle, 2 draw lines, and that is how you can make a human figure.

Move them in different directions and you can make different actions. So we can see now these human figures on horse, simple design. It is the simplest beauty. Isn't it? It is possible to communicate. So well that there is no loss of information even if it is 25000 years.

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# ***A teacher of 2000 years ago***

- **'Just' a drop of water**

Let us go to the next teacher. So 2000 years ago a teacher asked a student to bring a glass of water. Student brought a glass of water. The teacher took the water, gave the empty glass to the student. The student went and kept the glass in the kitchen. Teacher called him back, 'So what did you do?' 'Sir, you asked me for a glass of water, I brought the glass of water and you took the water and I went back and kept the empty glass in the kitchen.' 'No, no, no. Tell me what did you do?' And he will ask this question and the student will repeat this 5 times, 7 times, 10 times and obviously the teacher was not satisfied.

The student said, 'Sir I know now what I did'. 'Tell me, what did you do', 'Sir I went to the kitchen, when you asked me for a glass of water, I brought the glass of water, you drank the water and you gave me the empty glass. While going back I threw just a few drops on the ground'. Then he said, 'Just a few drops, he got it then. He should have dropped those few drops in a garden. In a drinking water plate for the birds. Now 2000 years ago there was no shortage of water.

For the next 1950 years there is not going to be a shortage of water. Correct? Population was so little and there were so many lakes and rivers. Why is the teacher building a value of saving a drop of water 2000 years in advance. He anticipated the problems of our society so much early. Are we going to solve the problems of today? Who will solve the problem which will arise after 500 years,

1000 years, 2000 years? Who will solve that problem? This teacher is solving that problem. He made us conscious. We may not meet the consciousness intact that is a different matter.

But there are people who will not keep the tap open when you go in mornings and wash your hands three times with soap. The tap can remain open or you can close it every time, put the soap on your hand and then open it again, then wash, then close, then wash, then close. We can do that isn't it. Some of you might be doing it actually. Those who realise that this water should not go to waste. Some of you may not be doing it.

But the thought arises in the mind, 'Am I doing it right?'. That thought, the seed of that thought, this teacher has planted.

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## ***A teacher of 20 years ago: 1998***

- Encounter with a shepherd in a desert: who is literate?

Now let me take you to a teacher I met 20 years ago. We were walking in the desert in *Kutch*. So I saw a shepherd who had about 200 sheep. I asked him, I waved at him,

**(FL From: 13:53 to 13:57)** '*Bhai rukna zara baat karni hai. Bahut garmi thi, thak gaye the. Socha chalo thoda masti karte hai.*' (Please wait for a bit, I want to talk. It was very hot, I was tired so thought I'll have some fun)

So I waved the hand please stop, he stopped. I thought I am a professor from IIMA (Indian Institute of Management, Ahmadabad), management professor, very reputed professor, very wise. I may be asking very intelligent questions. So I said, 'if one of your sheep gets mixed with the herd of

another, what will you do?'. I was having a program of *Shod Yatra* in my hand. The shepherd heard me, he said, 'Please give me this piece of paper'. So, I gave him the piece of paper. He put the whole program in front of him. He said, 'For me all the letters look alike'.

You know it was a slap on my face, to me all the sheep looked alike. That is why I asked that question. It was one of the most foolish questions I ever asked in my life.

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## **A teacher of 20 years ago: 1998**

- I was illiterate in his language of sheep, he was illiterate in my languages of letters, yet I was naïve to assume a superior education

And he gave me a slap almost. He said, 'Look, I am illiterate in your language. You are illiterate in my language. What is different between us. You cannot make out the difference between two sheep? I can, I know each sheep is unique'. Which is true. This teacher is accessible to all of us. That is what I am trying to say. Let me take you to another teacher. So there was a film being made by *Jayantibhai* from Indian Space Research Organisation.

So we went to *Karim* bhai, not Gujarat, near a forest, Balaram Jaiswal Sanctuary. On the fringe of that sanctuary there is this village, *Behrampur* was there. There was a stone, so we asked him to sit down there. I was sitting on another stone and he was setting his camera, and then he said, 'Sir, it would be nice if you had a twig of a plant or shrub in his hand, that will look nice. We are going to talk about herbal healing'. He was a potter but he used to heal the people.

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## ***A teacher who understands nature***

- Fundamentals of frugality
- Why did you pluck this twig? Did we need it?  
Asked karim bhai while we were setting the stage for filming an interview with him on healing

So I plucked a small twig from the roadside plant, a weed and gave it to Karim Bhai. And Karim Bhai got upset. I said, ‘What happened? Why are you upset?’ He said, ‘Did we need this twig?’ I said, it will look nice, that is what the photographer thought.

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## ***A teacher who understands nature***

- Then I could have sat near the plants on roadside, instead of plucking the twigs, But then, like a fool, I say, are not there so many of these “weeds” on the road side?

‘Then you should have told me, I would have gone and sat near the plant’. Like a fool I said, ‘But there are so many of these. If we took one twig what great has happened? Why are you so upset?’ He said, ‘What did you say? So many? In nature, there is never too many’. Can you imagine I used to pluck the blade of grass, put it in my mouth. If I was standing near a bush I would pick a leaf, crush it, that was my instinctive reaction? Now if I try to pluck anything, immediately Karim Bhai comes in front, ‘Do you need it?’ There is nothing in nature which is extra, everything is in place.

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So there are teachers of all kinds. There is another teacher I met. In *Champaran*, we were in *Shod Yatra*. Out of 150 km of walk, there was one pen, a grand pen which was so beautiful like this. You can see that. Beautiful? Only one. So we asked the lady of the house, ‘Why did you make such a beautiful pen’.

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### **A teacher for whom the excellence is imperative**

- How else could I've done it? The only choice.
- Will we have the humility to learn from Ms. Ram Timari Devi?

She said, ‘But that is the only way I know’. Oh my God. Excellence is imperative. ‘You are helpless? You do not know mediocre ways of doing things?’ ‘No I do not know’. ‘But everybody else has made those’. ‘Maybe, I know only this’. When you are helpless, you cannot do a mediocre job because you are helpless. Oh my god that culture can produce some much inertia. It is strange

isn't it. The same culture which produces, which generates context for people like Ram Kumari Devi also produces people like us.

We have become so patient with mediocrity, with something that we don't even approve of. Sometimes you do things which, from your own standard, it is not so good, correct? But you manage life, move on.

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She did not. Now look at another teacher, a teacher in paradoxes. Now the whole word is becoming paradoxical. The future belongs to paradoxes. In every discipline now we encourage students to learn paradoxical. That means you look at the contradictions. If there is a distribution. Look at the two tails of the distribution. All the time, a dialogue, an enquiry is not complete if it looks at only one tail of the distribution. By habit we should be paradoxical.

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## ***A teacher in paradoxes :***

- Inviting birds to stay
- Collecting manure to use it in the field

Look at this, this community in Jharkhand is attracting birds, correct? By hanging these pots. So that they can collect their manure in the gunny bags and use it in the field. The birds are producing fertilizer, the first fertilizer in the world which was taken into account was called guano. It was collected from Amazon and brought to England.

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### ***Keeping birds away***



Now look at what happened at my Institute. We are designers. We do not design products and services. We also design relationships. We design, and as we say as in this class, the last point is connections. We connect different world views with different parts of our life. Here, we are connecting or disconnecting. ‘Sir, they make noise, sometimes they make love, sometimes they do something else outside my window’.

**(FL: 19:04)** ‘*Are yaar, kya dikat hai?*’ (Dear friend, what is the issue?)

Love is the most beautiful thing in the world. Is that a paradox?

I teach, I want you to become sensitive to nature and I do this. You would not believe me then. You will say that ‘You are a hypocrite’. Of course this hypocrisy of the highest order. How do we learn from collective intelligence? This is one subject becoming extremely topical now. All over the world. *Gandhi ji* on 24th July 1929, gave a call, a global call for ideas. The award was 7700 pound at that time, 1 lakh rupees.

In today's currency to about 10 crore rupees. The award was for redesigning his spinning wheel and if we look at this announcement that *Gandhi ji* design, it gives you the boundary conditions of the final solution. He did not know what will be the final solution. But he said the count of yarn should be some much, the weight of the machine should not be so much that it becomes difficult to move it. The working of the machine should not make a woman tired in 8 hours of work.

The maintenance cost would not be more than 20% of the machines cost in a year. All this is specified in the design. Can you imagine? Here he looked at that, and then he said, ‘You can have a patent. But if you want the award money you must assign the patent to the Charkha committee’. First crowd sourcing of the design was done in 1929, do not think it is recent phenomena. This is another example of the same process at a community level.

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The idea is the same that we want to learn from strangers from people around.

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## ***A teacher among the community***

- Nurturing networks
- Nine grains, nine neighbours

So, this festival in Sikkim requires you to collect 9 grains on that day around *Raksha Bandhan* from 9 different grains from 9 neighbours. So, let us say the next door neighbour gave you a particular bean, sprouted bean and the next neighbour also gave you the same sprouted bean. You have to go further, till you find 9 different grains, which may mean you may have to go to 40 people or 50 people. What are you doing? You are renewing your social network? People whom you normally do not meet. That day, because the culture has created rituals, you have to meet all of them and say, 'Hello', and 'How are you? Ok, what are you doing?' and 'Give me a bean'.

And everybody keeps these pots of sprouts with them. What a wonderful way of reviving the context. Making the community come to know each other, renew the connections.

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So we were walking in *Kangra*, we saw this tree and we went to the tree **(FL: 21:22)** '*Bhai kya hua*' (What happened here?), I asked the tree. The tree said, 'I am not supposed to branch, but by mistake I did so I did the next best thing. I made it a parallel stand.'

**(FL: 22:08)** '*Yaar kamaal hai*' (That is wonderful). That is great. So I said that is a very interesting point because when I am talking to you some cells in my body are going through mutation. Thank god they are not cancerous. So, I can continue to talk to you? What is my body doing? It is either repairing them or replacing them or by passing them or regenerating them.

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## **Autopoiesis at grassroots for inclusive development**

- Capacity to redesign itself during the process of use

It is doing something which gives my machinery working without creating any problem. This capacity of a system to redesign itself during the process of use is called Autopoiesis. So when we design some product and services and during the process of its utilization, it can learn and that it can improve according to the needs, variable needs, changing needs of the users, that will be autopoiesis of life.

Say if a knife after cutting things becomes shaper, there are knives like that because they are given a lot of temper. That is also autopoiesis. It is repairing itself. It is healing itself. Challenge is a very difficult concern but nature teaches us this. Theoretically, not theoretically, empirically this possibility exists in nature. All of us are an evident proof of that, in our own body it is happening. Large numbers of compensatory pathways emerge in our life. In our neural networks sometimes some cells are in a problem and other cells' synaptic connections emerge in our network and they composite for the connections that were weak.

We can prepare, our body can heal itself. Doesn't it heal itself? Of course it can. How do we learn from nature therefore? So all of these teachers that I mentioned about, are teachers who help us to learn from the grass root level. They do not charge us fees. None of the teachers charged any fees to me.

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It doesn't mean

I will be honest. That does not mean that there are no fees due to them. I am in a debt of them. They taught me such useful lessons which I am sharing with you. And how do I pay that fee? By being more empathetic in whatever I do. By being more inclusive in whatever I do and by ensuring that I do not lead to exclusion of the community, of the nature, of the people, of the needy people in my research, in my design and in my activities.

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So we try to search, spread, celebrate innovations and sense the unmet needs. These are the 4 functions of every *Shod Yatra* invariably and aids. You could have an innovation club and that club would do the same thing. Search, spread in local language, cross pollination in Marathi, in Telugu, in Tamil and Gujarati, not just in English. Local community does not understand English

most of them. Then we are not sharing with them, you may claim that we are sharing with them but you are not.

**(Video Start Time: 25:24)**

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