Lecture – 23c
Creativity techniques (Part 2 of 2)

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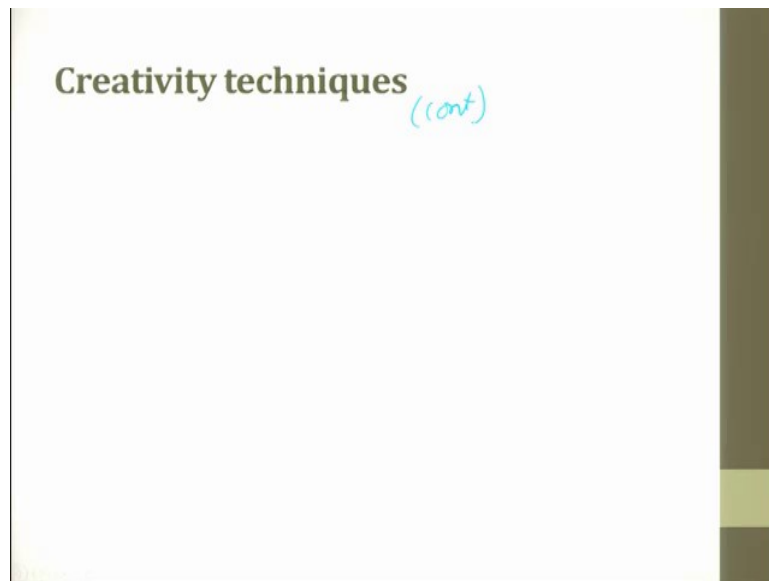
Welcome back to the Creativity techniques lecture. This is a continuation lecture. So, what we were trying to see is; we were trying to see all different possible techniques, which can be used to induce creativity, so that is what our technique is. But in this all please do understand, you should have a clear problem definition. In the clear problem definition, it includes; who will be the customer. And if you do not solve this problem, what is this impact going to be.

For example, I would like to go from Kanpur to Delhi within 2 hours, right. So, this is what is my desire; this is not essential, it is desire; right. So, if I say that, I want to go, so then the alternatives I have is; I should use only the airways, road way or the railway is not possible. So, when I say airways then I am left with only 3 options, 3 options are go by helicopter, go by plane, whatever it is, or go Vayudoot And these 3 are no way an economical solution for me. So, the other alternative is, can I develop an individual driving vehicle; unmanned vehicle, which can go from here to Delhi with minimum power and cost economical.
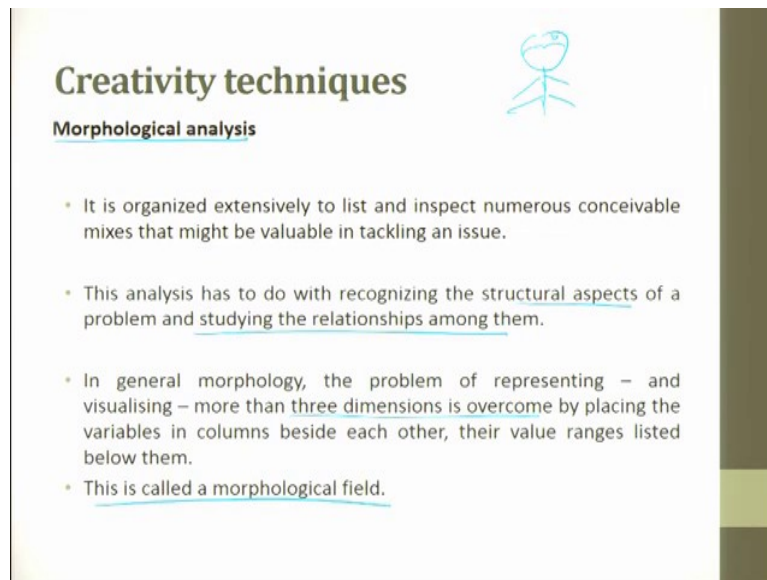
Now, if the solution is not there; am I going to get throttle? no, I will go to Lucknow and I catch a flight and go that is more economical. So, now, you see if I start working and solving this problem, then there is no solution for it and the creativity will not come very high. So, you should always look for a problem, where; if this problem is not solved these are the difficulties which community is going to face and the community cannot be me it can be a group of people, it should be a group of people; right.

So, when you have that, then only you can think of alternative creative solutions. I give you an example of my son going to school with the uniform, creative solution, it is a really creative. Second thing there was a day when they all the class children were trying to move from one building to the other building in between; that two buildings were almost 1 kilometre away, in between there was a small room.

So, where and which there has the students were drenched in rain, but if they could have taken a stop by and the small building in between that could have been much better. And the stop by building, they have has the permission to stay, they did not put for the problem statement properly to that building owner. So, he did not permit, all the students got drenched in rain.

So, the creative solution would have been; the teacher could have gone or a student could have gone and talk to him these are the difficulties, if you do not allow us to have a stop by in your building, so students will get drenched, all of them have problems, this problem, that problem. They if that would have been stated properly, then people have look for creative solutions. Creativity is very important and if you are not creative in solving the problem, you will not be able to come out with solutions.

Going back to it, we saw two techniques; brainstorming technique and the other one we saw now: we are going to see the morphological analysis. It is organised extensively to list and inspect numerous conceivable mixes that might be valuable in tackling an issue, that is morphological analysis. This analysis have to do with recognising the structural aspect of your problem and studying the relationship among them.

For example, if you have a body, if your body pains and if your hand pains, because of your hand pain, there is your headache. So, then there is a relationship between the problem, you have to study the relationship amongst them and try to solve the problem. In general morphology, the problem of representing and visualising more than three-dimensional is overcome by placing them variable in columns besides each other, their value ranges listing them below and this is called as morphological field. So, this is another technique or analysis, we do in creating techniques.

Morphological analysis is a method for exploring all possible solutions in a complex problem space. Imagine the problem is transporting an object from one place to another by way of a powered vehicle. The significant dimensions are: the kind of vehicle, the power source and the media, so these are three-dimensional. So, now we use this analysis; is a method of exploring all possible solutions in a complex problem space, ok.

Thus a car kind of vehicle moving over rough surface with an internal combustion engine to power, it is the automobile. The expectation is that, it would be possible to determine some novel combinations to generated. For example, you can put the vehicle, you can put the media, you can put the power. So, now, you see a relationship with that and then start solving the problem.

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As a problem-structuring and problem-solving technique; morphological analysis was designed for multi-dimensional, non-quantifiable problems, where casual modelling and simulation do not function well at all, there we use this morphological analysis. Please understand, where do we use is very important. Zwicky developed this approach to address seemingly non-reducible complexity. Using the techniques of Cross Consistency Assessment; CCA. The system, however does not allow the reduction, not by reducing the number of variables involved, but by reducing the number of possible solutions through the elimination of illogical solution, combination in a grid box.

So, please understand if you have a problem to be solved; a problem, I will write it down a process. So, if there are 10 variables input; ok, if you have 10 input variables and here is a solution for the problem, this is the solution, the wise man is to try to look into the effect of individual things, ok. And please do not drop any input and then start looking for solution, it is better you take all the inputs play significant insignificant and then try to generate ideas, then try to find out multiple solutions to the problem, then pick up the one, which is relevant and then sort, solving it.
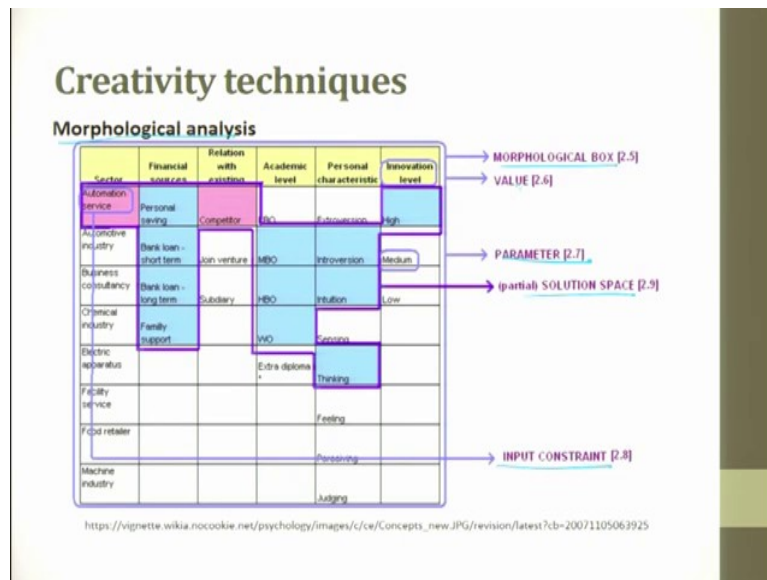
Morphological analysis, this is how we do sectors, finance sources, then you see a relationship with the existing, academic, personnel and innovation. If you look into it, so you see that, so we have put in the parameters, we have put in the solution space; ok, we have looked at morphological box and then we have put an input constraints. So, these are constraints what we work. And this is the morphological block and the we have values for it, then we look at these values for solving.

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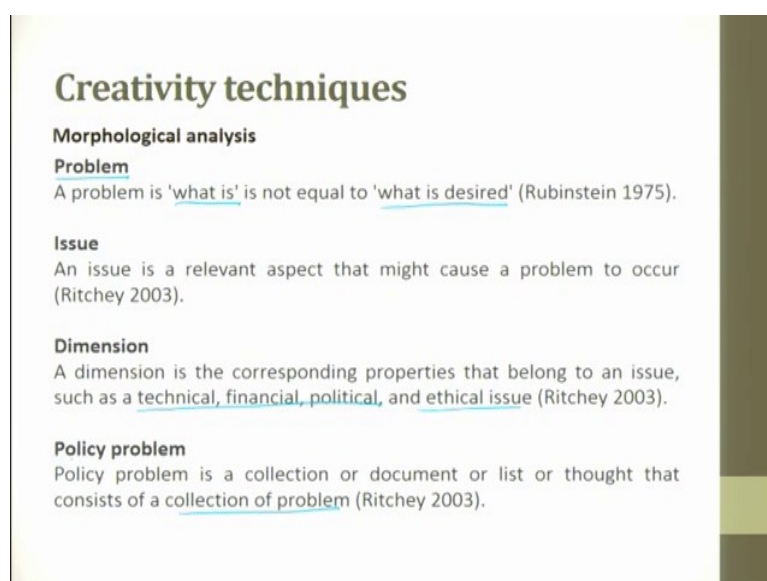
Morphological analysis; a problem; a problem is 'what is ?' is not equal to 'what is desired ?' please understand, 'what is ?' is not equal to 'what is desire?' An issue is a relevant aspect that might cause a problem to occur. A dimension is a corresponding property that belong to an issue such as technical, financial, political or ethical, these are dimensions to solve the problem. Policy problem is a collection or document or a list or thought that consist of a collection of problems is policy problem.

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Morphological boxes you have, same way you have morphological feel and you also have values, a value is a representation of a possible relevant condition that each issue can assume, which will become the column header of the morphological box. So, if you look at it, if you go back to the figure, you can look from this figure, you can understand what we are discussing here.

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Then you have parameters, you have input constraints, solution space and real actions.

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The next technique is attribute listing technique. These are two steps in the attribute listing techniques, the first is to list all the variable characteristics of the study object, all the variable characteristics, you have to do various characteristics. The second is to purposefully change or alter these attributes. By the method of this, it is conceivable to unite new mixing of quantities or traits that will satisfy some current needs in a better way, ok. For example, this

is nothing but a cut and paste technology, which we follow towards solution: cut and paste technology. So, the second is to purposefully change or alter this attributes; ok, you are change their attributes and then solve it.

Attributes listing is a great technique of ensuring all possible aspects of a problem has been examine, you are giving attributes values to it. Attribute listing is breaking the problem down into smaller and smaller bits and see what you discover when you do.

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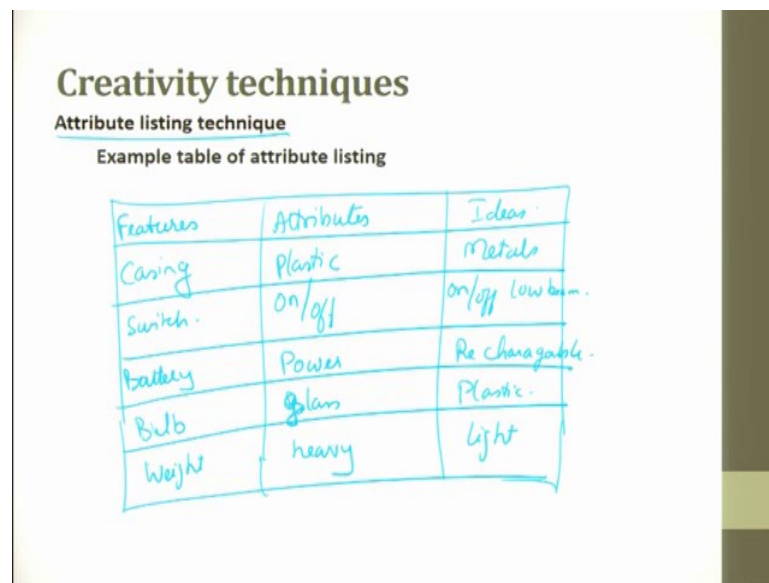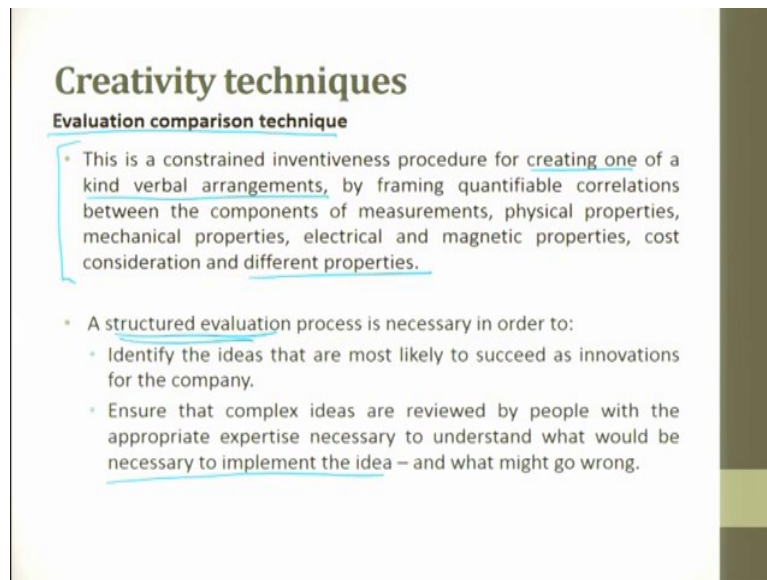
So, it is basically you try to take a big problem, split it into several small modules and then start listing it. So, when you talk about attributes, for example, I will draw a table. So, we have features, we have attributes, we have ideas; ok. So, casing, this can be made out of plastic; the ideas is: it can also be made out of metals; next is switch feature. So, it what is a switch, it has on, off and it has also low beam. Battery; we have it is power, the idea can be rechargeable.

This can be bulb, this can be glass, this can be a plastic and then we have weight, heavy, light, ok. So, these are some of the attributes listing techniques, where and which you list, split bigger problem into smaller problem. Smaller problem you have attributes, you have ideas and then start looking for creatively slowing those problems.

So, evaluation comparison technique. So, you have develop so many techniques, now you have to compare these techniques and pick up the best one. This is a constrained the inventiveness procedure for creating one of a kind variable arrangement, by framing quantifiable correlation between the components of measurement, physical property, mechanical property, electrical, magnetic property, cost contribution and cost consideration and different properties, all these things are considered. And you try to compare them and evaluate them.

A structured evaluation process is necessary in order to do. So, you have 10 parameters, you have to evaluate them on various aspects. So, we have to do a structured evaluation. Identifying the idea that are most likely to succeed as innovative for the company. Ensure the complex ideas are reviewed by people with the appropriate expertise necessary to understand, what would be the necessary to implement the idea and what might go wrong.

So, you just go to somebody and ask, if I buy this car what will happen, what will be the advantage I get? what will be the problem? If I take up a directorship; what are all the advantage? what are all the disadvantage? If there is a problem; how do I solve it, if there is a plus point; how do I enjoy it. So, something like that is all is evaluation comparison technique. So, what you do you go to an expert talk to him and then decide what is what, and then you take a car. So, evaluation comparison technique continuing. Enabling a middle manager to define the idea to a senior management, stakeholder and financial officer, who may need to grand budgetary proposals for it, you do an evaluation comparison technique.
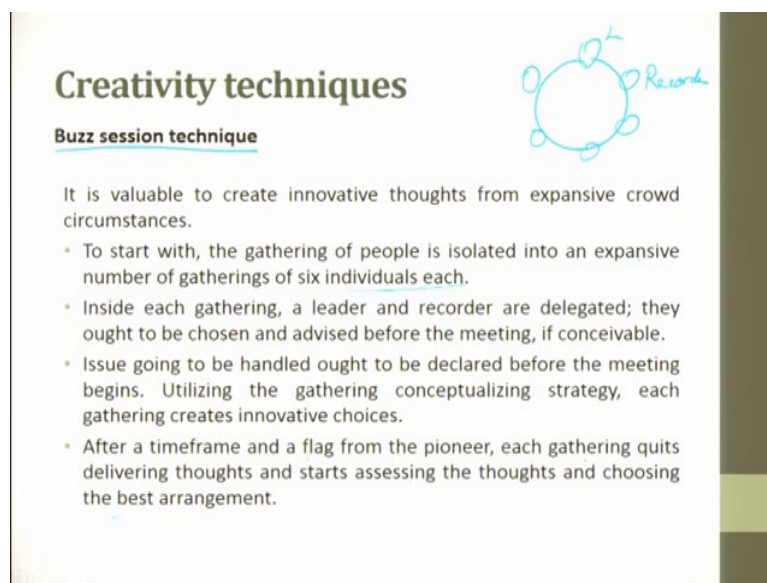
For example, when you are trying to develop a new product and come to a market, we say company A; these are the features of company A, these are the features of company B. And this is my design and you will try to say my design, when you compare these features these are all better. So, please grant me money or please grant my project. So, then people will say, yes, it is looking to be lucrative, let us grant.

Make it possible to review a large number of ideas in a resource. Improve the ideas by identifying potential implementation problem and preparing suitable actions to overcome these problems. Sadly, the last aspect is often last informal idea review procedure. So, what is it, improve the idea by identifying potential implementation problems and prepare suitable actions to overcome these problems. For example, you will try to anticipate, when you have a big lab. So, in a big lab where there are multiple machines there. So, you would have planned

everything properly, but if there is a fire, what happens; everything will get burnt and it has to dissolve.

So, the best thing will be; you plan anticipate to have a fire extinguisher here, so that you try to have this as a safety. You anticipated a problem; you had a solution, you fix it there and then the entire shop floor or the lab can do, these are machine 1, machine 2, machine 3, machine 4 and machine 5, ok. So, this is what improve the idea by identifying potential implementation problems, I prepare suitably, I appearance to over comes these problems, ok.

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Buzz session technique. It is valuable to create innovative thoughts for expensive crowd circumstances. To start with, the gathering of people is isolated into an expensive number of gathering of six individual each. Inside each gathering, a leader and a recorder are delegated. So, there are 6; 1, 2, 3, 4, 5 and 6. So, one is a leader; one is a recorder; are delegated. They ought to be chosen and advised before the meeting, if conceivable. Issue going to be handled or to be declare before the meeting begins.
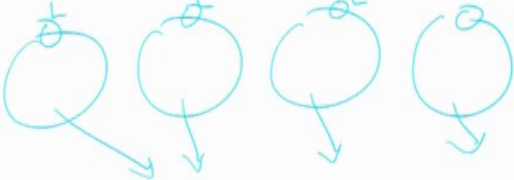
Utilising the gathering conceptualization, strategy, each gathering creates innovative choices. After a time frame and a flag from the pioneer, so each gathering quits delivering thoughts and starts assessing the thoughts and choosing the best arrangement, ok. So, once they say time is over, then they put all the things improvise them, rank them and then see what is to be done.

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The leader of the gathering is called upon to display the thoughts, deliverables to whatever is left of the group onlookers. The variety of good, broadening thought issues, influences or incredible, vast to bunch persuading, innovative showing. Attributes and quantities that will satisfy some current needs are selected. So, what we do? So, you have multiple groups formed, and you had a leader.

So, each leader will come and present the groups problems or solutions, he will come and present. Now, when he comes and presents, so the others will all try to have a look, and they will all have an opportunity of expanding their ideas and the new thoughts, broadening it, and then they try to find out different concepts and then come towards the solution.
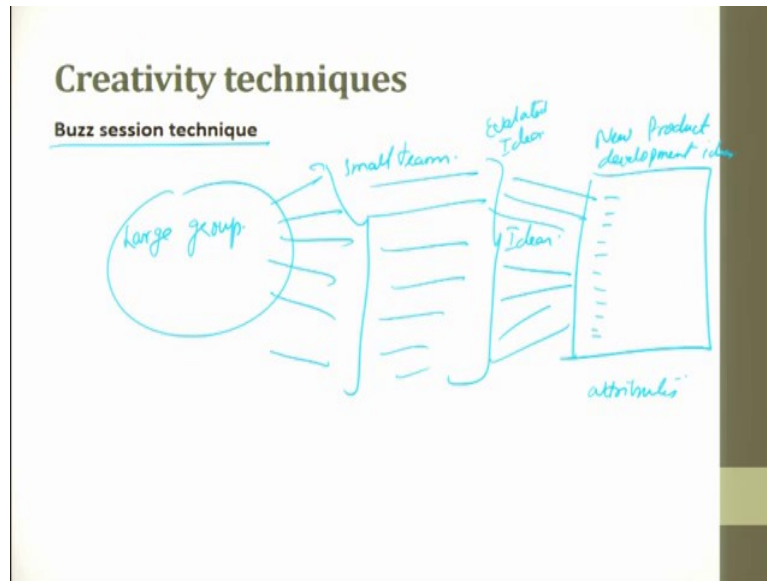
So, this is a large group which we were discussing; a large group. So, this large group is split into small teams. So, these are small teams, ok. These small teams evaluate; here you have ideas, evaluating ideas, ok. And then, what happens, we try to join back and put all those things into a board or something, which is new product development ideas. So, you will have many things here and then it develops, so, this is ideas. So, these are all ideas; which are evaluated ideas.

 So, this is a buzz session technique, large group, small teams, large group; you split into small teams, small teams you get ideas. These ideas are evaluated and then it is put on a board and where and which you try to put: pick and paste, cut and do technologies and then you try to put all the new ideas. When you put the ideas, you also try to put attributes to the ideas and start working on it.

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The Crawford slip writing technique. This is another technique uniquely suited for a huge group of onlookers. This method is a type of individual brainstorming. This procedure gives numerous plants to an extensive variety of various issues in a single session in a brief time frame. It is simple, powerful way to gather ideas to address issues facing your work area, ok.

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So, this is what is the Crawford slip writing technique. You put all these name tags and then you attach these tags with each other and then you try it or this can be major point, a legend

point. And you have all the other things attached with the legend point; you can discuss, so that is what is Crawford writing.

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So, in this writing a, by writing down the ideas, everyone will have an equal chance to have heard, which is not usually in the case of traditional meeting. Suppose if 6 people are there, when I try to say, you should understand one thing, data, information and knowledge, ok. Data are multiple; from that we get to have some knowledge, from that we get an information, information to knowledge.

When we start doing this data to information, information to knowledge, it is always a normalisation technique. So, when we do normalization, data a lot of variance in the data points are lost, so that is what is written here. By writing down ideas, we give them piece of paper, we tell them the problem statement, we ask everybody please put down all your thoughts in a board. So, we will look at the board and then decide.

So, by writing down ideas, everyone will have an equal chance to be heard, which is not usually the case in the traditional meeting. You can address both general and specific problems with this method, making it quite versatile. It is a time-efficient way of gathering ideas, rather than having an open brainstorm session. So, many people are introverts, they do not even open out. On a lighter note, when a father and a son talks in the traditional Indian

cultural way, this son does not talk to the father, the subordinate does not talk to his boss, right.

So, if you do a brainstorming session also we will not have all the possible ideas getting out of the group. So, this technique is proved to be more and more successful. There is a plenty of time to review all the ideas after meeting has ended, meaning you can take a clear picture of the thought of individuals in your organisation, sit back and play with it and start solving it. So, this is what is the Crawford slip writing technique.

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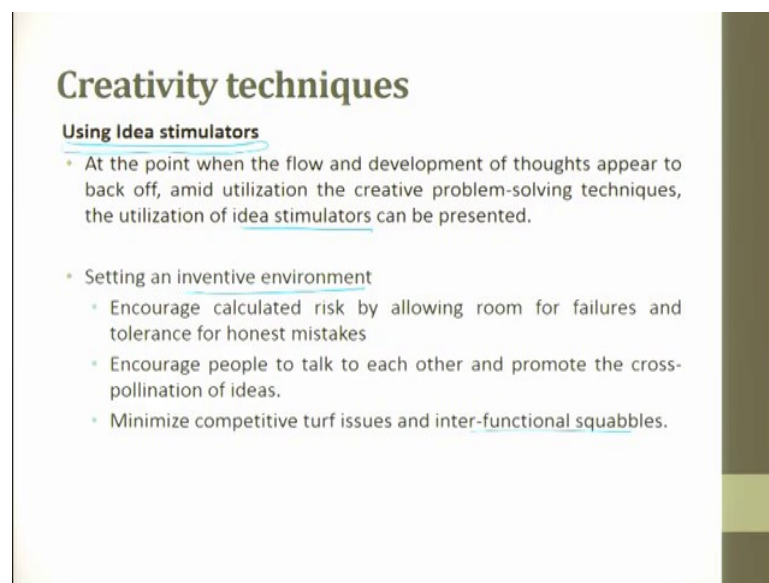
Use idea simulator at this point; when the flow on the development of thought appears to back off, amid utilising the creative problem-solving techniques, the utilisation of idea simulator can be presented. Setting an inventor environment, encourage calculated risk by allowing room for failures and tolerance for honest mistakes, ok. Encourage people to talk to each other and promote the cross pollination of ideas. Minimize competitive turf issues and inter-functional squabbles ok. So, these are simulators. You say them hey, you tell me the truth, I will not beat. You try to work on this idea if it is a failure I still support you; these are all stimulators, ok.

So, nowadays what we do is including the results, what we do is we try to pick up, hand pick people; who are experts in that area, try to take them to a hill top or try to take them to a very, very nature beautiful place and then hope keep all the experts together for a week or for 3

days and start discussing them. So, we give them a wonderful treatment, give them a wonderful room, give them a wonderful room where every facility is there. So, they start discussing and the entire ambience is a stimulator for them, ok. Today nowadays in big institutes, in renowned institutes, the classroom is held in open air. They sit down below a tree and then start doing it. So, they say the environment is stimulator, so the students can learn more. So, stimulators are many, ok.

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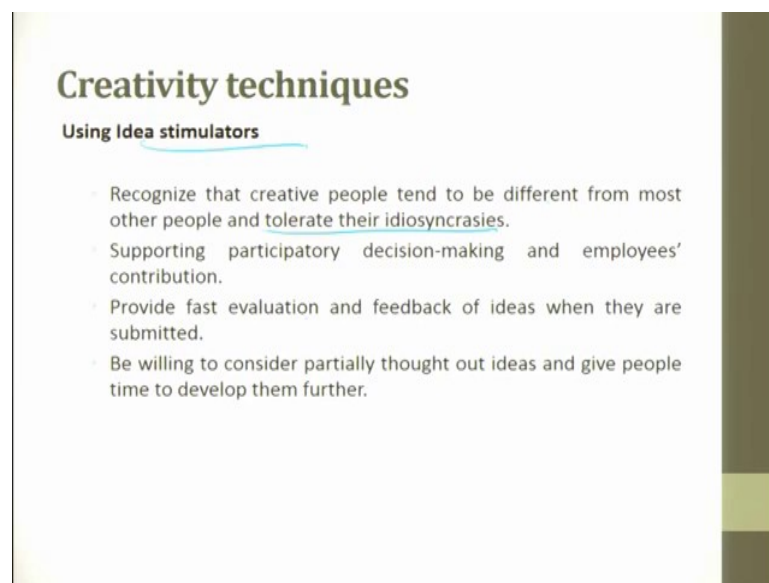
So, the using idea of stimulator is better thing. Recognising that creative people tend to differ from most others and tolerate from the ideologies. Supporting preparatory decision-making and employees contribution provide fast evaluation and feedback of ideas when they are submitted. Be willing to consider partial thought out ideas and give people time to develop the thoughts.

Many a times in a meeting what happens peoples where I am half way, so should I still present, and then say no do not waste our time, but no it is not so. You should give them enough time, you say please go ahead, let us see if there is any interesting thing coming up, so that is what is the things.

And idea stimulator, I will tell you another thing; in Toyota company what they do is, they have a policy that the employees are allowed to give ideas, which innovative ideas, are improvising ideas inside their factory premises, also whatever good for the employees. And

the whenever they give an idea; they get a ice cream token. So, what happens now in that company is peoples they wanted an ice cream, so they start writing out multiple ideas and they keep doing it.

So, they get for each idea, they drop it is a coupon and they don't look into the idea; whether it is good, bad, feasible, non-feasible anything, for an idea you get an ice cream. So, now what has happened people after a period of time, they would have been exhausted with number of ideas, number of problems. And now what will happen is they will really looks stringently for a problem to solve. So, by this is a simulator and this gives them a possibility of giving more solutions to the problem and improvising.

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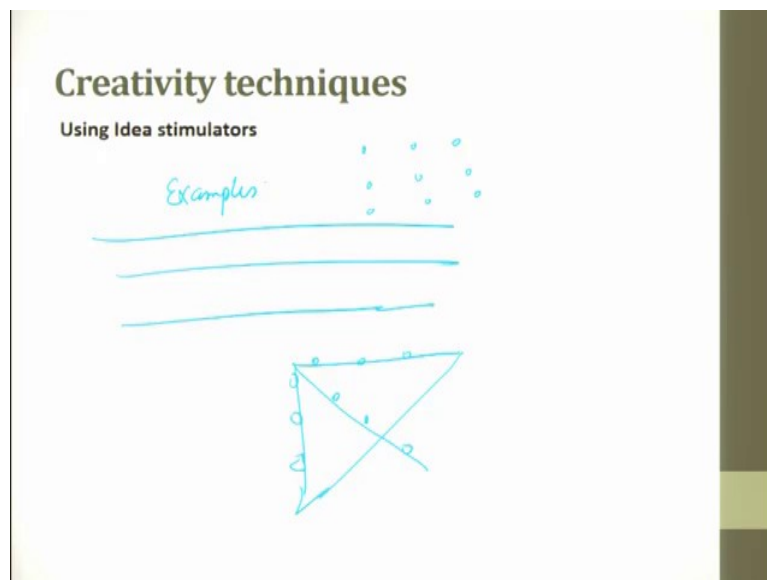
The company has got a huge benefit out of it. So, when you try to do this idea simulator, we can have examples, we can have multiple examples. So, these are the things and we can have solutions. These are examples and these are solutions. And these are attributes, and then you can have this as solutions. So, all these attributes can be fixed here, and then you can have multiple solutions to solve; whatever it is. So, it is like a tic tac toe, you tried solving it then, then you get it. So, this is one way of doing it.

Delphi technique; Delphi technique is, you talk to expert and then ask experts opinion and then get the make a questionnaire, talk to him and then they start giving you creative techniques, they give lot of ideas, so that is Delphi technique. Delphi technique sometimes; it gets cute also. So, many a times if the expert is all are of likeminded people, all have a same view of thought and all of them are artists.

So, they all have a similar thinking, when and then the problem might gets cured. But talking to an expert will always give you more insight to problem. It is a method of pulling large number of expert's judgement through a series of increasing fined questioners. It was originated originally in 1950 and even today it is followed, then voice of customer are ask are when the ideas are to be generator. So, we always look at wise. It is a structured variant of traditional expert polls and is usually used in forecasting Delphi technique is used in forecasting; whether this business to go or not.

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So, Delphi technique involves circulating questionnaire. The administrator of the Delphi method makes a decision based on the results in the round. Delphi method helps the group reach consensus without influence of any strong member in the Delphi technique.

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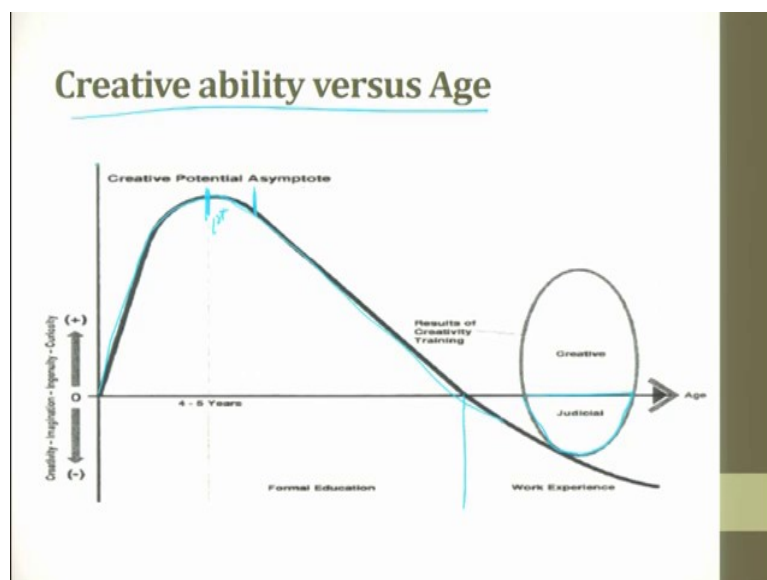
So, moving further, so this is creativity. So, if you see here, creativity ability versus age, this is the age. When you are moving to the age of 5, you have maximum creativity; 0 to 5 you have maximum creativity. After that the curve starts dropping a down maybe, you start

studying in a structured way. So, all your creativity goes down drastically, ok. So, after coming here, this might be at the age of maybe 40 or 50 or 60, so the creativity goes in the negative side.

So, what is the creativity goes in negative side? Creativity, when it goes in the negative side, you become judgemental, judicial. So, you become judgemental. So, judgemental means your imagination is stop, you start critically looking and start commenting. The creativity goes down, when you have a formal education. So, this is a time, you do not; this is why we start our first standard class from here, grade 1 from here, ok.

Many companies, many countries shift that grade 1 to 6 years or 7 years also. So, there they understand and they say that if we could have a unstructured way of learning things, then it is good they try to evolve of their own. If there is a structural learning, evolution becomes little more tougher. So, in Japan what they do is up to the age of maybe 3rd grade or 4th grade, they do not even have examination, they learn, what is manner, they learn discipline, they learn to respect each other, they learn to work in team. So, these are the things which they do up to grade 3. So, you see that the creativity potential goes very high for them. The graph may be shifted to this point.

And then, once you have a structured thing, what happens is; when you have structured thing people start putting sense and then they say it is not feasible, because of this, this in is all your crazy ideas are killed. In fact, there is a saying that big gurus, they keep saying that in companies, you should have a separate time saying that crazy ideas time in a week 1 hour each department should have crazy ideas hour. So, during that time people keep throwing all crazy ideas and we keep noting those things maybe in that we can do, when we do cut and paste, we get out a good solution to solve a particular problem, ok.

So, this is what is creativity, imagination, ingenuity and curiosity, keeps increasing until the age of 4 or 5, then it start decreasing, because you get a structured education. And then once you start working, this goes down and you start doing it. So, this is the result of creativity and training and this is judicial. And the here you become more judgmental and your creativity is reduced. So, this is what is the negative plane. You will have a zero plane, when you finish your education ok. So, this is a very, very important graph, you should understand this with respect to age how do you go about.

To recapitulate:

1. What do you understand by creativity and what are the two general approaches to problem solving ?
2. What are the steps involved in creative process ?
3. What are the main blocks to creativity?
4. What are the factors conducive to creativity?
5. What are the creativity techniques which helps in identify and solve the problems?
6. Is creative ability related to age?

So, to recap in this particular chapter, we try to cover what do you understand by creativity and what are the two general process of solve problem-solving, what are the steps involved in creative process? What are the main blocks of creativity, we saw what are the different factors conducive to creativity, what are the creative techniques which help in identify and solving the problem. Here we saw many, many, many, many techniques and at the last we saw what is the link between the creating ability and age, so we saw that.

So, I have a question or an assignment to add. So, you will have an assignment, again not to be submitted assign, ok. Since I have written assignments, I will have to give you 2 assignments. So, one assignment is you will try to take a piece of paper; ok, try to take a piece of paper and tried giving it this is to a child ok, try to take a piece of paper and tell the child to convert, it into any 3D form. You will not give any other devices, glue not allowed; ok, no other devices you will provide. You will give him A-4 sheet and then tell him; please convert this A4 sheet, which is a 2D into a 3D form. This you will go give it to a child.

So, now, what will happen is, let us put 3 categories of child 0 to 5, 5 to 10 years, 10 to 15 years; ok. And then what you do is you will try to take the same A-4 sheet; a 2D A-4 sheet ok. Now, your age group is going to be 15 to 20, 20 to 30, 30 to 40, you will try to show them. And then ask them to convert it into a 3D form; ok, again I will not give any devices, inside the 3D form, I will try to keep an egg and drop the egg from a height of 5 meters or maybe. So, if you want to make it feasible, we can make it as 3 metres; second floors, 3 meters or 4 meters.

So, you will say I am giving you an A-4 sheet or you give them a A-4 card board sheet, slightly thick; ok, cardboard sheet. And tell them that they have to converted into a form, into a box, where which inside the box I am going to keep an egg and I am going to drop the egg from 3 meters. The egg should not get damaged, ask him to do this. So, you will see what amount of creativity comes.

 And you also have a timeline. So, you give them both a time of 30 minutes, because nobody has infinity time so, you do it; ok. Depending upon your age, you yourself can pick one assignment for you and the rest to you can ask your friends to do it; ok. So, please do this assignment. So, this is a problem where and which it has to be converted into a creative thinking and you get a solution of it.

Thank you very much.