Product Design and Innovation
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Lecture - 09
Creative Techniques and Tools for Concept Generation, Concept Evaluation

Hello friends, welcome to module 4. In this module, we will discuss about creative techniques and tools for concept generation and after discussing all the techniques, we would finally discuss about concept evaluation. This module would be jointly taken by me, and my colleague, assistant professor Supradip Das. So let us see what we will cover in this module and what would be the learning outcomes from this module.

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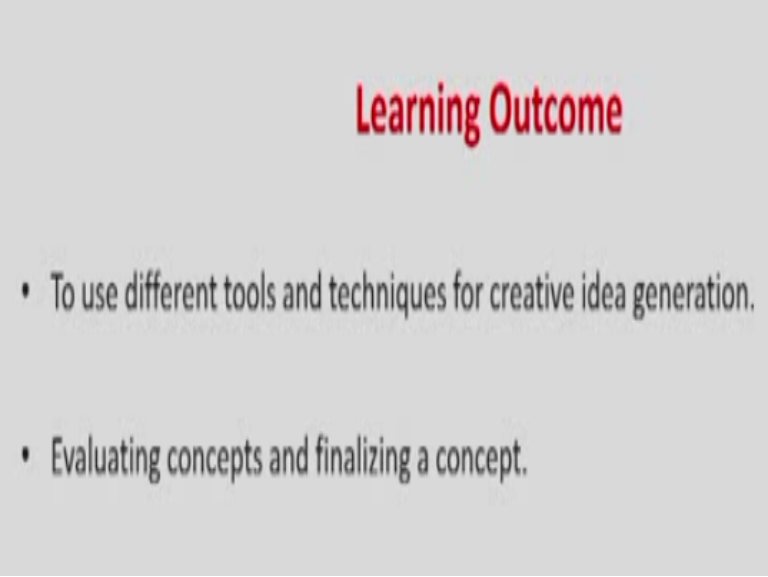

Friends, in this module, we will be discussing about how to use different tools and techniques for creative idea generation. I am sure this module would be one of the most significant and interesting modules for all of you as designed as the most crucial part in designing a product is the conceptualization phrase. Whatever we have discussed until now from the first module to the third module, talks about how you gather information, understand different processes, materials, products, be tangible or to some extent intangible.

But this is the module, in which you will understand or rather we will discuss how interesting ideas can be generated. Friends, when we talk about generation of ideas, many a time as

designers, we cannot guarantee that this is the moment, when we will get an idea. It is very difficult to anticipate that actual situation, that moment when we will get an idea or as a matter of fact, we may get many ideas.

But whether each one of them is innovative in nature. By innovative, I mean, there is a degree of newness in your concept is question that always arises in the mind of designers. If you have seen literatures or if you see what visionaries and designers in the past and understand their works, you can notice some subtle important information, which if practiced would provide us with certain inputs, regarding how interesting ideas or ideas, which are significant in nature.

The 'aaha' moment can be captured. We will discuss about all these techniques in detail, after completing discussing about different tools and techniques for idea generation, we would finally talk about evaluating concepts and finalizing a concept. This is the other most important segment in this module, why? You would be doing an assignments in this course, you would realize that you will not have one, but many ideas.

The question that would be put in front of you is which one do you select or rather let me say it in this way, which one should you take forward to the production or the development phase. This is a very complex situation, given the amount of ideas that you have generated. To help designers address this issue, there are some evaluation matrices that supports designers to decide, which one or which of the many ideas, you can select and move forward towards the development phase.

After this module, it is expected that you would be able to come up with some creative ideas using the techniques and tools that we will discuss and once those concepts are there with you, you would be able to evaluate them select one of the concepts and take it forward to the evaluation or development stage and testing it with your end users. So let us start the first part of this module. Since creativity is a buzz word, if you hear or if you see around every discipline that we talk about.

In higher studies, as well as in organizations, the only thing that matters is how much creative you are. So the word creativity itself can be explained as ways through which multiple ideas are networked, intervened, or connected or concepts are connected to come up with a better concept. That is how we define creativity as. But the catch here is apart from being creative, you also need to be innovative in nature, which means the ideas that you are generating should have a degree of newness in them.

Now this is only possible when you have understood the market, the existing products, we have studied them in detail and you know the benchmark that are available across the market. Once you know the benchmark. Once you know what has existed, it is already possible to extrapolate or think of concepts that extends the boundary of what is existing currently in the market. So this is the intention of a designer while pursuing the design process.

Now here comes the question how do you become creative. Can creativity be trained, is there a process by which a person can become more creative. This is an elusive question, a question, which many a time, many people relate with the famous anecdote whether the hen was the first one to arrive or the egg was the first one to arrive, but if you read literatures across creativity studies, you would realize that over a period of time various psychologist, design researchers as well as scientists have said that creativity can be trained over a period of time.

How do they say that? They say that based on the basis that there are techniques through which creative ideas can be generated. Here, I would suggest you to read the book InGenious written by Tine Seelig of Stanford Creativity Lab. There, she exhaustibly talks about her experience with students and in the class to come up with ideas. She also discusses many techniques. Some of the techniques that we will discuss today is in reference to the lectures and the commentaries of professor Tina Seelig.

Now today, we would start with some general techniques about three techniques, which we will discuss and the latter part of this module, which would be covered by my colleague assistant professor Supradip Das. He would discuss details about multiple tools that are extensively used, which are rigid in nature, but when diligently followed, provides greater impedance on creative

idea generation. So let us start about discussing the first point, few general techniques about creativity.

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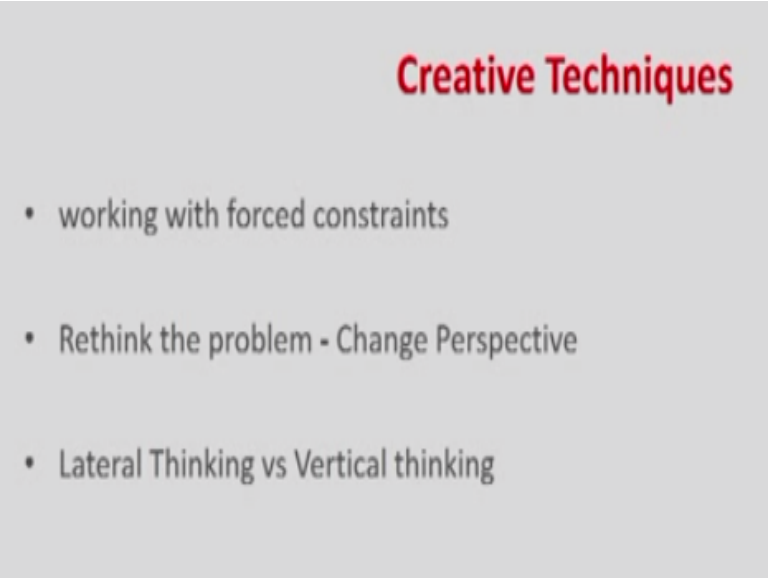

The first one is working with forced constraints. This is a very unique approach of coming up with the interesting ideas. Working with forced constraints, when constraints are there, the constraints are enshrined into your mind that you cannot think of anything else beyond what is being mentioned to you. That is the first technique through which you can come up with creative ideas. The second one is rethink the problem, change perspective.

Friends, many people say that the way you define a question, or the way a question is being put forward, it exactly encapsulates the answer in it. So question itself has the answer in it. So designers, we need to learn, how do we rephrase the problem statement. How do we change perspective? and the third one is lateral versus vertical thinking. This is a very common discussion across the design fraternity about having one way of looking at concept and digging it throughout to come up with extensions of the same concept versus thinking about multiple concept.

We would discuss about these three techniques. These are general techniques of creative idea generation in detail today. Working with forced constants.

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What do you feel when I say that abundance create a lot of confusion? What do you understand or what do you comprehend from this statement? See even if you see an interface, for example, if you look at an interface, and you have multiple features in that interface, many tasks can be completed. You really get confused and it is the same with your users. They also get confused. So more always creates confusion in the mind of the person.

Therefore, the first technique that we are discussing today, it talks about working with forced constraints. So resource abundance, can actually be counterproductive. This is what literature tells us. For example, if you to that come up with a concept of a juicer and you start about thinking about a concept, you would see your mind going around in multiple directions and it becomes a very tough time for you to really identify which direction if you move, would provide you with meaningful concepts.

Problems, challenges, and opportunities, they become more manageable with constraints that directs us to make the based out of what we have. In those situation, if we set or define a direction, it becomes more manageable for us to think about certain concepts in a more detailed way. Let me give you an example about what we are talking here. Imagine, the said example, the brief is we are supposed to design a juicer for the Indian housewives.

That is what exactly the brief says. The moment you get this brief and you start conceptualization, as I said, your ideas can go in any direction and it can become really tough for you to catch hold of one idea and define it or rather detail out with a great degree of versatility. To complete this situation, with the situation I am saying now, as a designer if I say or if I think that lower extremity me first think about the cost.

I am only going to think in the direction of cost. My intention is that I have seen in the market, the minimum cost price of a juicer is around 500 rupees. I am assuming. It is an example; it is not perfect, but just say we taking an example. Think that that the least amount of price or the minimum price of a juicer product in the market is rupees 500. Now why will I get this brief, I think of cost as a constraint and I decide that let me work it out in this way.

I would conceptualize a product where cost is the constraint and for me, I want to design a product that is within rupees 100, that does not exceed 100 rupees wherein goes for production and comes out in the market. What happens when you make the statement inside you? You clearly get a direction. Is not it? You clearly get a direction, the direction in which your concept generation should proceed.

That means we are going to think about the materials that are being used in coming up with the low cost like the juicer. You are also going to think about the functions and features and you are going to think about how to reduce them and use minimum number of parts so that the cost can be reduced and you also want to look at the product as an affordable one that people can just use it for some few times and discard it and then buy another one.

It is like a disposable juicer. After 5, 6, or 10 trials, it can be disposed off. Have you seen the power this first technique provides us with? The moment you define a constraint like cost, in the example that we discussed, it provides you with enormous insights or enormous through which you can really think about creative products. Products that are unique and that will provide you with sufficient impedance to start your journey of conceptualization.

The same can be done, for example if you do not want to use cost, then set constraint like materials. The same thing, I am going to design an affordable juicer with paper. Friends, it provides you with lot of opportunities. When the moment you talk about materials and you allow your imagination to only focus on that material and not focus on the other things that you have at your disposal. Imagine the power of this concept.

When you talk about a juicer, that is made out of paper. That means, it must be robust in nature. It must be disposable in nature and all other characteristics that define using paper as a juicer should be explored and think about the power of an idea. There is a juicer on the go, you are probably buy 10 pieces of this juicer, keep it along with you, in your bags, in your wallets and anything, and whenever you want to use it, you can just pull it out and use it.

Make it come out of its shape, and then use this juicer. Now constraints can also be put in terms of timelines and deadlines. I asked many of my students to come up with concepts within 2 hours. I put a deadline to them that you have to come up with a concept within the next 2 hours. Believe me, it works exceedingly well. The first technique that we have discussed today tells us to work with forced constraints.

I am sure with the examples that I have given, you have got a glimpse of what forced constraints talk about.

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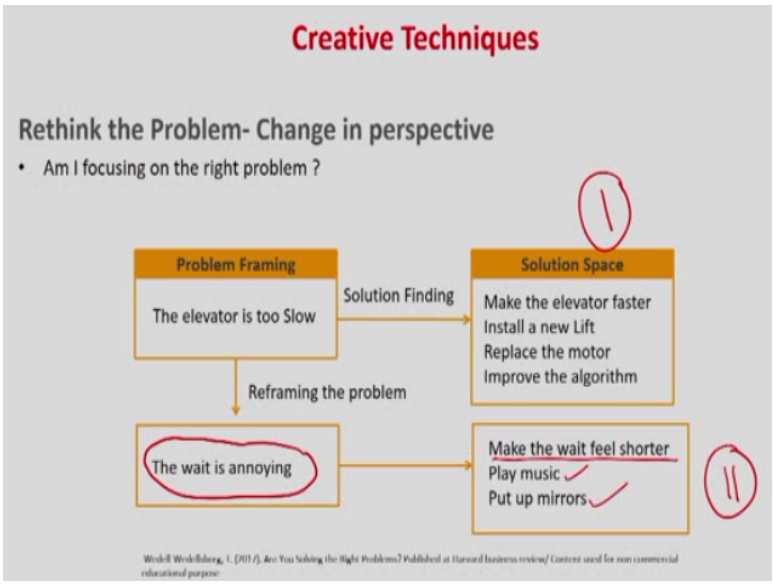

We will now move on to the next technique, which talks about rethink the problem, changing perspective. If you remember our discussion we had during module 2, I did talk about changing perspectives. Perspectives are very crucial in the life of any one of us. We judge a person based on the perspectives or the frames we have. For example, the moves I am talking about. These frames influence us the way we construct reality across us.

The next technique is rethink the problem, change in perspective. Perspective is a very crucial think in day to day, right from comprehending about our surroundings to interacting with our friends, perspective influence our thoughts, our actions and on decisions. Consider this, we had a bad frame or a frame with negative emotions about a particular thing about a particular friend. Now the same friend when it comes down, even if he is truthful or he is dutiful, and that person comes in front of us, we would behave in a very weird way.

Because of the frame of reference that we have for him. This is the power of perspective. Perspective influences your ability or it influences how you visualize reality. Whatever you see in reality or you comprehend about it, is always influenced by the frames of reference we have. Here, the second most important point is can we change this frame of reference or if we change the frame of reference, how does it benefit us.

Friends, in the discussion in module 2 regarding user study, we discussed about changing perspectives as well. Remember I talked about an example or about a statement, I made where I said, consider the statement: The sun rises from the east. This is an universal truth right. While this statement is true, the other statements like, the sun does not rise from the west. The does not rise from the north and south either. These are also true.

This is to some extent; you can appreciate how perspective influence our thoughts. Let us look at a classical example of lifts. If you see here, the problem that is being provided to you is that the elevator is too slow. The brief is the elevator is too slow and you are supposed to think about a concept to address this issue. Now the moment you hear this statement, the elevator is too slow, it is a leading statement anyway.

You start thinking about concepts and what are the general concepts that you might come up with, make the elevator faster, install a new lift, replace the motor, or improve the algorithm. At the first stage or the first moment, these are the most crucial concepts or important concepts that comes up to our mind. Now what happens if we change the perspective. We refrain the problem statement that we had initially discussed altogether. Let us see what happens.

The moment we reframe the problem, you can see in the slide that we can think about the elevator is too slow as the rate is annoying. We can really think about that whether the elevator is too slow or the time taken by the users to reach from point A to point B is long and therefore, this delay or this long period of time is making people annoying. This long wait is annoying for them. What happens if you reframe the problem in this way?

The solution that you figure out is drastically different. Let us see what solution can be figured out for the rephrased problem. So the focus would be to make the wait feel shorter. Now to do this, what we can do, can play some music inside the lift, we can put up some mirrors. If you see and compare, the solutions that you have observed in the first stage, which is the first stage versus the second stage, what do you observe. You will observe that the solutions are drastically different.

Friends, here we are not discussing about whether solution 1 is better or solution 2 is better. What we are trying to say is how to come up with more creative and innovative ideas. While if you see the first solution, install a new lift, replace the motor, improve the algorithm, seems very common and probably everyone given this problem statement will come up with these ideas. The moment you rephrase the problem, or the change the perspective, the concepts that you get, like play music, put up mirrors.

So that people can watch themselves while they are moving from point A to point B and then somehow they can kill the time, something very drastic in nature, but not obvious in nature and many people will not think in this line. This is the power of changing perspective. Remember, one way is to look to the problem from different frames of reference that you have. Try doing this and it will provide you with creative results.

One of the basic tools that are used for changing or reframing the problem or changing the perspective is by asking the question why. This is a very powerful question.

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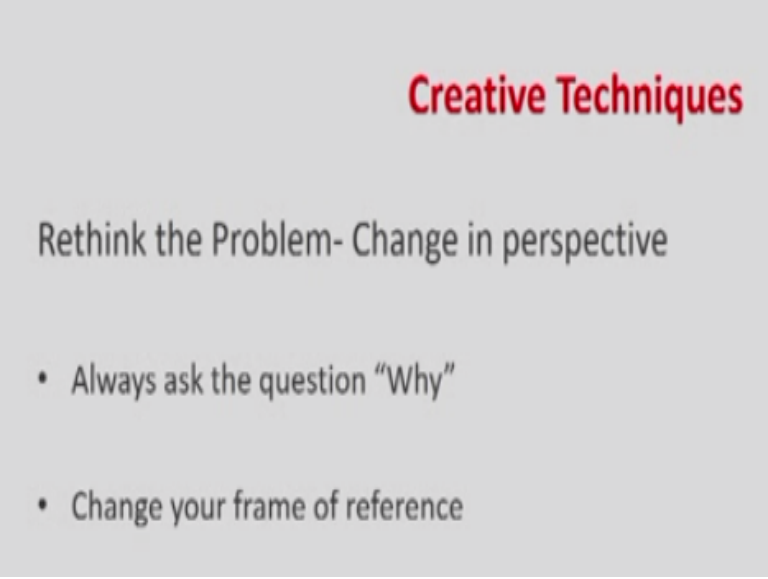

Whenever a brief is given to you, always raise this question that why do I need to see brief in the way it is being provided to me. What are the different ways in which a brief can be viewed? When I talk about designing a bridge, it essentially does not talk about only relating 2 land

masses divided by river. It also talks about movement of people. It talks about connecting people. It talks about connecting or delivering commodities from one place to another.

This is a very powerful technique. The moment a brief is given to you, the first thing all of you should do is question it, ask the question why and try to rephrase the problem. Try to change the frame from where you are viewing the problem, that means changing perspective and then see it will provide you with miraculous ways of getting concepts. The next technique that we would be discussing is lateral versus vertical thinking.

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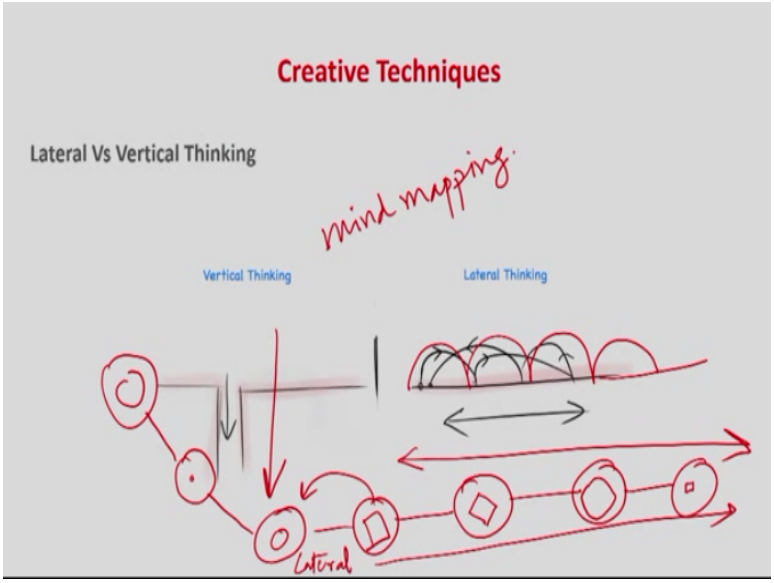

As the word is very simple in nature and probably the word would tell you about what lateral and vertical is. If you look at this picture, digging something down, down, down is called as lateral and when you move from one point to the other and from other and to the other, and to the other, this is more like we are going in a horizontal direction. That is more lateral thinking. What you mean by that.

So think about an example that in a village, we are suppose to dig a well to figure out water. How does a well dug out, you dig at a particular place and the moment the water table is little bit higher, you decide that, let us go in that one. It can also happen that you are unable to figure out water table or if the water table is much lower, so you dig it in that place even more, even more and go on digging that well in that particular point.

This is one way of looking at it. The other way of looking at it is, you abandon that space and you move to the adjacent area and start digging there. After some initial exploration, you again abandon that area and look for something else beside that adjacent area, that is more like horizontal or lateral thinking. What is the benefit of this? Think about a concept, as a tool as a product, so what happens?

When we think about the concept as a tool, as a product, our mind is very clever. It is always biased and it continues to think in that direction of concept itself, either crooking one feature or changing one feature or changing something here and there, but it would continue thinking in the direction of the concept, particular concept. That is what I call as a vertical thinking. Many a time, what you should practice is the moment the concept comes to your mind, continue thinking for some time.

After that, abandon that concept. How do think, you have to doodle out in your sketch book. After doodling it in your sketch book, abandon that idea and go for drastically different concept that is not in any way similar to what you have thought off. Like these, if you continue thinking about drastically different ideas, which does not or has no relation with the previous one, will make your concepts be more powerful.

That is an example of how lateral thinking and vertical thinking is carried out. You probably use one of the most powerful techniques in doing this, is mind mapping. In mind mapping, what we do is we doodle out a concept, like this and we continue thinking in those directions. For example, let me place this square as there, or does not look good, then okay, let me little bit make the edges round, and see how it happens, but it does not look good.

Let me reduce the size of it, let me see it looks good, but we are continuing to think in the direction of the square. Now this is one square. The other one is thinking about a circle. Now okay what about the circle. Let me see if I can think about a smaller circle or bigger circle. This is what a mind map does. It captures the doodles and let you know in which direction your concepts are moving.

If you see here, this is vertical only, because you are focusing on the square itself, but the moment you changed, this is more lateral in nature. You are right. This is more lateral in nature. You can use this kind of doodling and with structures, which are often called as mind maps to create your concepts.

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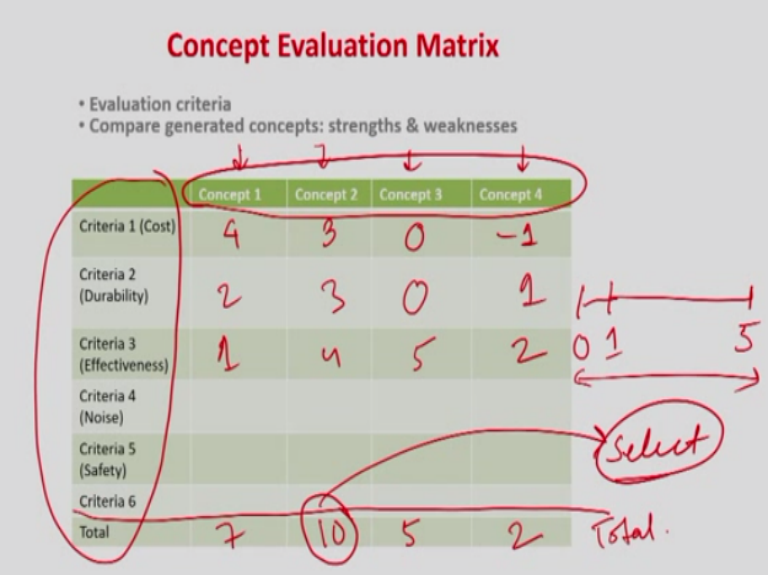

The last part of this module of concept evaluation until now we have covered the various techniques and tools based on which creative ideas can be generated. Concept evaluation is very important step in your design process. Following the various tools and techniques that we have discussed, you might land in a position, where you will have multiple ideas or concept in front of you. It is also vital for a designer to finally select one of the best ideas and proceed towards the final development stage.

Now how do you select the final or the best one out of all the concepts that you have generated. I know that discarding one concept over the other is very painful for designers, because each one is equally dear to the designers, but to make sure that we come to the realization phrase where a product is manufactured and delivered to the market, we need to select one. Concept evaluation matrix provides us with that platform or with that tool through which we can evaluate our concepts and select the final concept.

So it is an evaluation criteria and what we do is we compare the generated concepts in terms of their strength and weakness. If you can see this table in the slide, in the left hand side of the table are the various criteria. What are criteria? Probably in your design brief or during your user study, you would be able to define the criteria based on which your product should be developed. For example, let us say an example the criteria are cost, durability, effectiveness, noise, safety.

This is one example of what we are seeing and on top of it, you have the various concepts that are put into here. So what concept evaluation matrix does, take a scale between 1 to 5 or say you can take it from 0 to 1 to 5, now what I want you to do is take each concept and provide score in the scale of 0 to 5, you can give negative also if it is the other way around and provide those scores in the respective criteria.

For example, when I am talking about concept 1, for the criteria 1 which is cost, the concept 1 stands at being very cheap, it would hardly take too much manufacturing cost, so that we can have a very least amount of cost price in the market. So I would give it 4. For concept 2, I think it is moderate, I mean it is not very low, but it is not highly priced as well, so I would provide it 3. Concept 3 would be really costly; I mean the kind of ideas that I have.

If I really try to make those things happen, it would become really costly, so probably I would give it a 0 and concept 4 is more costly, I mean very, very costly. It is exactly the opposite to what we have thought of them, I can give -1 as well, I mean if I feel like. Similarly, we do rank, I mean we provide marks for each one of these criteria across these concepts, say 2, 3, 0, 1, 5, 4, 1, 2. Like this, once you put these marks and calculate the total marks here.

So for example, if there are only 3 criteria and we have 4 concepts here, if you see, if you sum all these values up, what you will get is totally 7 here, here it is 10, here it is 5, here it is 2. Finally, based on this score, you can select concept 2 as the best performing concept across all the concepts that you have generated and you can select this concept and move it towards your detailed drawing and manufacturing stage. This is about concept evaluation.

Always make sure that once you have all the concepts, you generate these criteria and evaluate your concept based on these criteria and finally select one out of them and proceed to the next phase of realization. Thank you.