Usability Engineering
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Module - 09
Lecture - 31
Conceptualization and prototyping I

Welcome to module 9, lecture number 29. In this module we are going to talk about the stages of Conceptualization and Prototyping Part 1. We will also extend this module to the next module, where in module 10 we will also discuss about Conceptualization and Prototyping Part 2.

Until now, you have observed that we have discussed about the various stages of user centered design process and this started with understanding the historical foundations of usability, how usability came into existence, role of computers, advent of various processing computational powers and how it evolved over the period of time.

Then we talked about the stages of the user centered design process, where we focused on various techniques of user data collection, be it qualitative methods and quantitative methods. This followed by extensive discussion on market study, in terms of conducting competitive analysis and from there we also talked about how to create benchmarks by comparing our, by identifying a threshold, from our competitors benchmark from our competitors and also comparing our ideas with the old ones.

So, with all these steps being covered, now we are aware of the design brief right. We have also discussed about this about in the last module. We are now at a stage where we know what kind of requirements we intend to address and also, we know what kind of or rather I can say in what direction our innovation should proceed. So, after we have the design brief with us, the next phase that is most critical for the design team is that is the phase for ideation.

And in that phase, we often call that phase as the phase of conceptualization and then followed by prototyping. We will discuss in this module this phase in detail about the various techniques and tools that are being used and would see how we can start the elementary foundations of defining the interfaces. So, let us begin.

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In this module we would start discussing about creativity and innovation. Now, the first thing that should come in our minds is how do we define creativity and what is innovation. See at this stage, when you have the specific data, when you have all your requirements at your hand and this requirement tells you about the frustrations about the issues that your users face. You are now in a position to inquire whether you can utilize your creative potential to address these issues and thereby support your target user.

And with this intention, when you begin you realize that now the creative faculties of your brain have to work out, in order to provide with ideas that you would like to see them realized for addressing the requirements of your users. And it is in this phase that creativity plays an important role in your life or in the life of the product design process by ensuring that you get ideas, and ideas which are unique novel and can solve the problem that you have identified.

There is a huge literatures and paradigms of research studies that revolves around the concept of creativity and innovation. And there are many tools and techniques that has evolved over the period of time to support designers, in this creative adventure. We will discuss about this in this session, but before we discuss about this let us first understand how creativity and innovation is defined.

Now, according to Cambridge Academic Content Dictionary, creativity is defined as the ability to produce original and unusual ideas, or to make something new or imaginative. So, if you see it is the ability and this is something which is related to the humans right, cognition is it not. So, creativity is considered as an ability to produce original and unusual ideas, it is not about usual ideas it is about original and unusual ideas or to make something new or imaginative. Something that is new or imaginative that is called creativity.

So, if creativity is about producing original and unusual ideas, it is the ability, then how do we define innovation? Now, innovation means it is a new idea or it is a new method. So, creativity is something if you see creativity, it is something that is very inert in the human beings. While innovation, it is something which is the product that we are talking about, is it not. So, you have this you see the bulb; so you know you get ideas the this is this designer, it the designer gets ideas and come up with the product right.

So, creativity is an ability of the designer while innovation is a characteristic of the product. So, innovation should be a new idea, it is a new idea or it can be method as well or even something we called as frameworks, it can be a process right or the use of new ideas and methods it is called innovation. So, that is something that we call as innovation. So, by using our ability of creativity, we innovate ideas, we come up with ideas that is what we are trying to it is being conveyed here.

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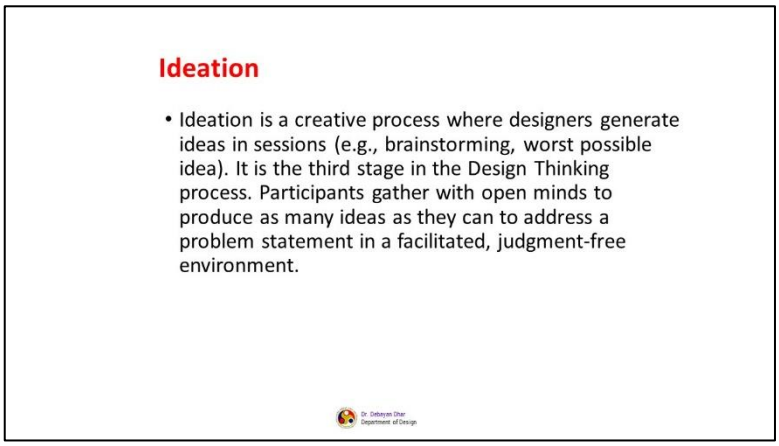

Now, with their ability to create, what we do is we ideate and that stage is called as ideation. So, ideation is a creative process where designers generate ideas in sessions. Many a time it happens that you know there are sessions planned across the design teams and see, we essentially are talking about a situation that is very industry specific.

And there you would see large teams are considered for a product design process, you have many people who are participate in the team and we are talking about those situations. Now, it does not mean that it has to be always a group activity, it can be very individual centric activity as well.

So, it is a third stage in the design thinking process because if you remember the design thinking process, we started with exploration we started with define. So, from exploration we defined, we analyzed, we then came up to the defined stage, we then defined persona also right.

And the fourth stage that we had is now what we are talking about the conceptualization stage where we are focusing on the how we come up with the ideas; that means, it is the third stage and the fourth stage where we go for prototyping.

So, it is the third stage in design thinking process where we focus on coming up with ideas, based on the requirements that has been defined at the second stage. So, participants gather with open minds to produce as many ideas as they can. See the focus here is to produce as many ideas as the participants or the design team can and these ideas are intended to solve the problem, a problem that is being identified, facilitate a judgment free environment right.

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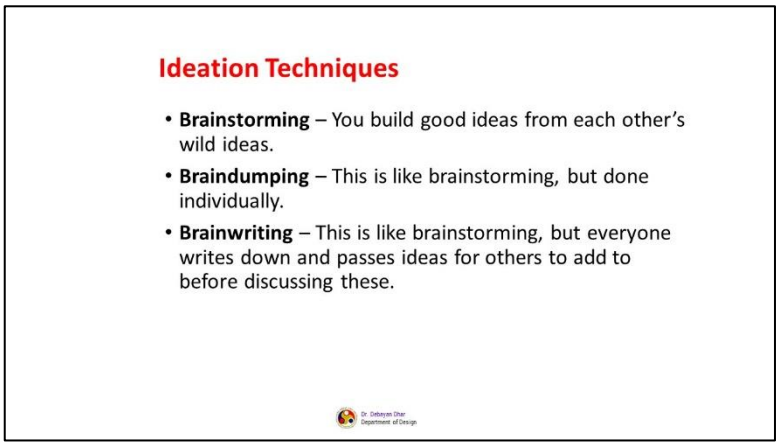

So, there are many ideation techniques that are being used by the designers. We will discuss few of them here, but before we start looking into ideas the design team must ensure that the problem is defined, that the problem; that means, the requirement that we have defined is sufficiently clear and its boundaries well known so that we can tackle it.

A focused problem statement or point of view to inspire and guide everyone. Means to guide the design team and for these some of the questions that might lead us towards it is questions like how might we questions.

For example, "how might we design an application finding cheap hotels in safe neighborhoods?" see the choice of words and these help in refraining issues and prompting effective collaboration towards potential solutions.

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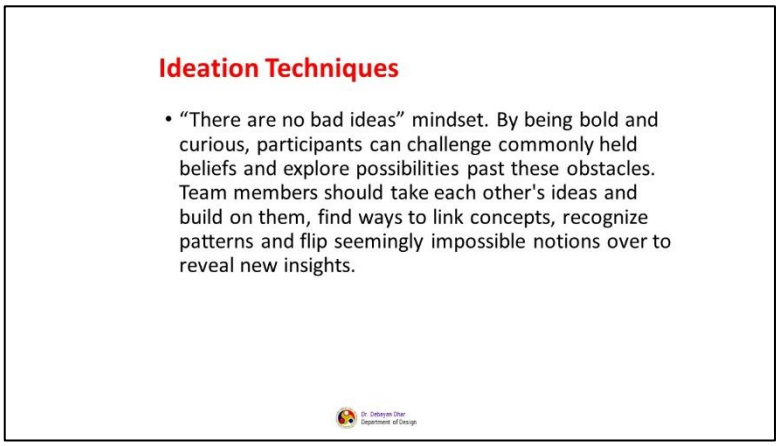

At this stage, at this stage of ideation it is important for the design team to remember and realize that there are no bad ideas, they must shun this mindset. By being bold and curious, participants, the design team should challenge actually commonly held beliefs and explore possibilities to overcome these obstacles.

The design team members should take each other's ideas and build upon them, and find ways to link concepts, recognize the patterns. That is what we have been focusing from the first module; focus and recognize the patterns and flip seemingly impossible notions over to reveal new insights.

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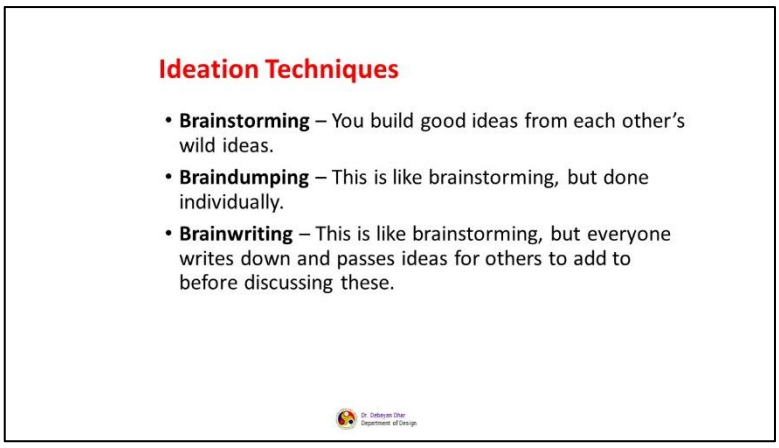

Now, some of the techniques that are being extensively used by the design team are first brainstorming. Now, brainstorming is about building good ideas from each other wild ideas. You know you are sitting in a team of 4-5 people and each one of you are coming up with ideas and you are exchanging your ideas. And you take up some others ideas and build upon those ideas collaboratively, that is brainstorming.

Brain dumping: now this is like brainstorming, but this difference is that it is done individually. So, you come up with ideas, you put some way of doodling it out or putting some marker to it so that you can keep a track of it and from each of the ideas you take cues and build upon another ideas.

Third one is the brainwriting: now this is like brainstorming again, but then everyone writes down and passes ideas for others to add to before discussing these. So, for example, you have the small cards, pack of cards.

So, if I am a member of the design team I take up one card, I write my idea and pass it on to my fellow colleague. He takes, he looks and takes the card looks at the idea that I have written he adds something to it or he then comes up with new ideas and then add adds to it and then pass it down to the other. Like this way these ideas get evolved from one team member to the other that is called as brain writing.

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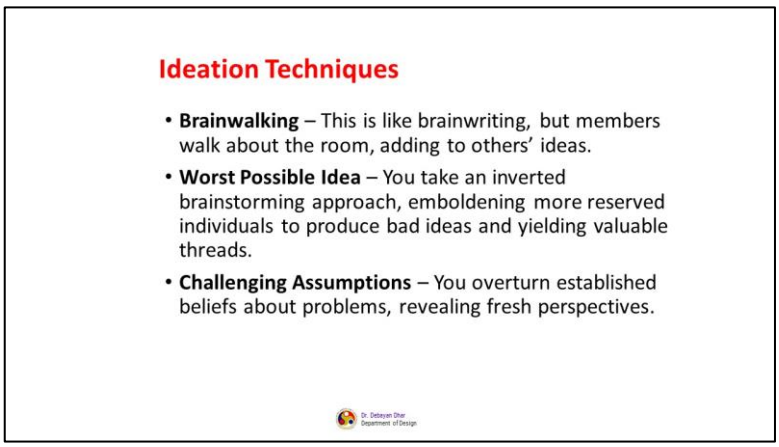

The fourth one is brainwalking: now this is like brainwriting, but members walk about the room adding to other ideas, it is like a play and you walk around the room by adding to other's ideas. So; that means, you add on to the ideas by including your concepts or your ideas as well.

Fifth one is worst possible idea, you take an inverted brainstorming approach, emboldening more reversed individuals to produce bad ideas and yielding valuable threads; that means, here the focus is on elimination of the worst possible idea by eliminating. So, you take an inverted brainstorming approach.

So, you are emboldening more reserved individuals, those who are more reserved like they do not want to talk in the team members to produce bad ideas, that the focus is to produce these bad ideas and then yielding valuable threads. These bad ideas can be eliminated or these bad ideas can be taken as a cue to come with more ideas you know. So, these can help in coming up with new unique and interesting idea, that is called worst possible idea.

Challenging assumptions: now in challenging assumptions you overturned established beliefs about problems, revealing fresh perspectives so; that means, you are changing the perspective altogether. We will see, we will look at a technique in detail in this challenging

assumption technique lately, when we stop when we complete discussing all these techniques.

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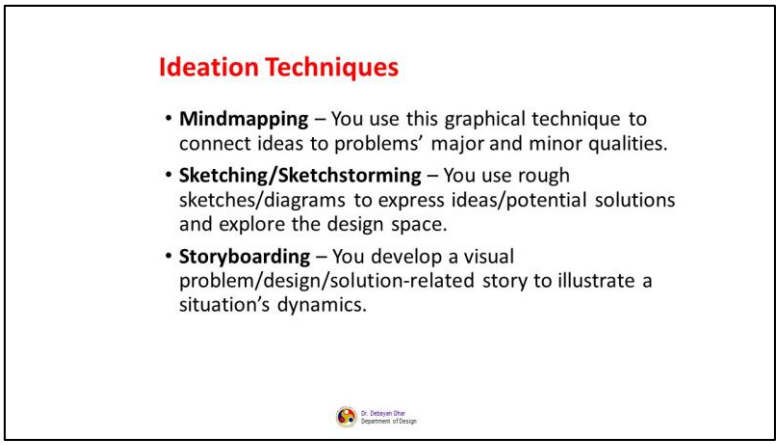

The seventh one is mind mapping and is one of the most widely used one among the design industry, and this is the one which is used by the team and is graphical in nature. So, you use this graphical technique to connect ideas to problems major and minor qualities, it is like a decision tree, it is like a tree you know.

So, what you do is like you get an idea you write it down this idea here and from this you trigger another idea, you write it down from here. Suddenly you get another idea from here, you write it down then again from here something like here, again from here you write something here again from this you write here.

So, this is a kind of organic structure that goes on being you know creating on its own that is called mind mapping. So, you are mapping the mind in terms of the ideas that are being generated

Then the eighth one is sketching and sketch storming: that means, you use rough sketches. So, you are using doodlings for example, I want to create a structure of the box and ok this is how I am going to open this box, you know probably I am not going to use a box and then I am just going to make it half and then there is a latch to it and therefore, I see that this is how it is being created.

So, these kinds of small small diagrams are being used to ensure that the ideas are documented. So, these are called sketching or skate storming and these express ideas potential solutions and explore the design space.

The ninth one is story boarding, it is a most prominent way of coming up with ideas. So, you develop a visual problem design solution related story, to illustrate a situation dynamic. See so, it is often being said that when you visualize the problem space or the requirement that you have defined and you think it in terms of episodes right or in terms of story, narration you tend to come up with ways through which you can solve it and you put that into storyboard.

So, storyboards are kind of these kind of structures where you write down the scenes. So, this is scene 1, scene 2, scene 3 and scene 4 so on and so forth. And you write down or draw something here and write down the sequences how the story line up goes through, right that is a that is called a storyboard.

So, storyboard means it narrates the scenes in the way, how it will be episodic in nature. So, in terms of the episode of how the first episode gets linked to the second episode in terms of its narrative experiences, a storyboard actually does that and you can put this together to make sure to elaborate the way through which you have thought about your ideas.

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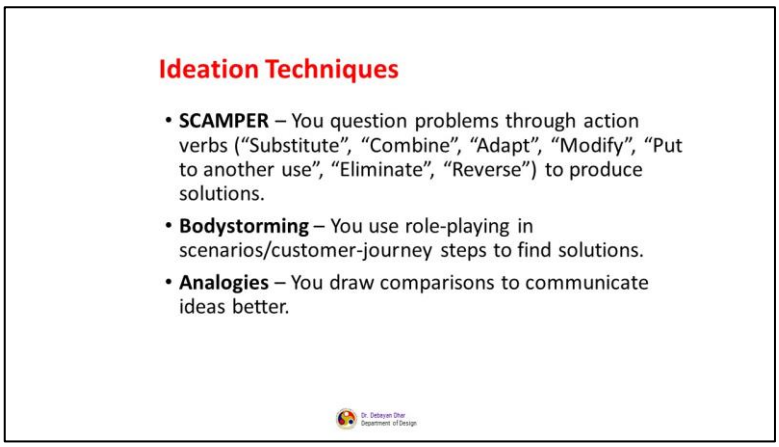

The tenth one is the most is one of the most used technique in product design which is called SCAMPER, now you question problems through action verbs. For example, substitute: you use these words to come up with something else about it. Then combine:

so combine different ideas together you substitute one idea with the other or one element with the other. Then adapt, then modify put to another use, eliminate, reverse, to produce solutions.

We will discuss about scamper in detail in subsequent lectures. The eleventh one is body storming. So, you use role playing in scenarios customer journey maps to find solutions. We will see an example of this one here, right now after we discuss these techniques.

The twelfth one is analogies: you draw comparisons to communicate ideas better. So, you tuck, you identify the relational approaches across various ideas or various products and see how you can combine them together to come up with an idea, that is what we called as analogies.

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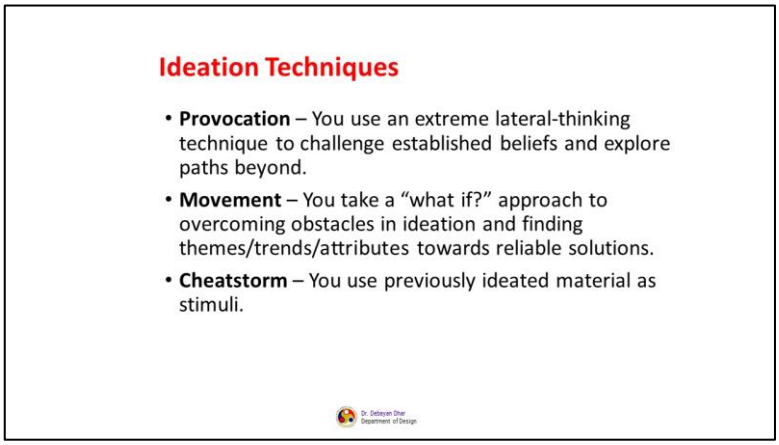

Then we have provocation; so you use an extreme lateral thinking. So, when see ideally in design you know in design thinking, workshops or in discussions you have often heard there are two types of thinking which is called the vertical thinking and the lateral thinking right.

Now, in vertical thinking what happens you have an idea and you dig it, dig it, dig it, until you are exhausted and no further ideas start popping up in your mind, that is vertical thinking. And lateral thinking means ok you have one idea, you list it down here then you just think about another idea which is not at all related to it, but is different to it. Likewise, you come up with different ideas. Now, what happens it says there is an analogy to it.

For example, if you are digging a well, you are digging the well at the same spot again and again again and you are going into the depth that is an example of vertical thinking. While it may be fruitful, it may not be fruitful, you may find water you may not find water, but then in lateral thinking what you do you do not dig too deeper, but you go on digging wells around this space from here to there, to there to that place to that place likewise right.

You do not dig vertically down completely, but you try to dig more and more wells at a till a particular height, depth across the place that is called lateral thinking.

The next one is movement. So, you take a what if question approach to overcome obstacles in ideation and finding themes, trends, attributes, towards reliable solutions. Then you have the cheat storm, you use previously ideated material as stimuli, if you have other projects you can use that and the final two are the crowd storming and the creative pause.

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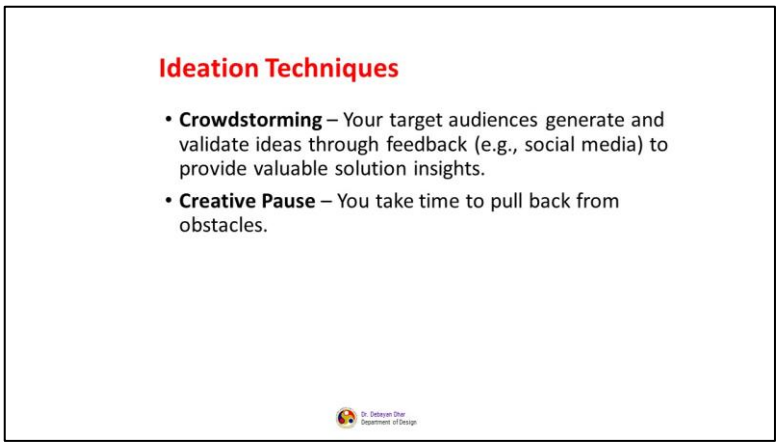

Now, in crowd storming your target audiences generate and validate ideas through feedback, for example, social media to provide valuable solution insights.

While in creative pause you take time to pull back from obstacles. So, therefore, there are some issue, you are in a jinx in a situation where there is no further ideas coming up, you take a break and then return to the situation after some time and then you might observe that ideas are again coming to your brain.

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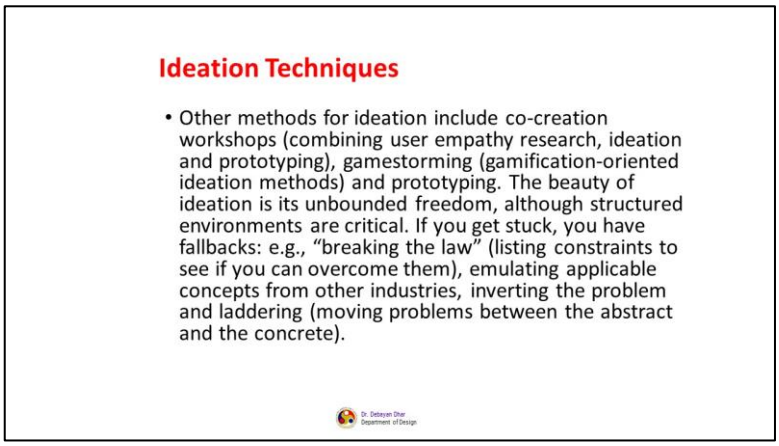

Now, there are other methods of ideation as well and these techniques include co creation workshops, like combining user empathy research, ideation and prototyping game storming. So, gamification-oriented ideation methods and prototyping are extensively used nowadays.

So, the beauty of ideation is its unbounded freedom, that is what we want as designer. The freedom to come up with any ideas, any ideas that can, that we feel will be able to solve the problem, although structured environments are critical.

Now, if you get stuck, you have fall backs, example "breaking the law" listing constraints to see if you can overcome them. Emulating applicable concepts from other industries or other products. So, you see a product you see some function mechanism there, you see the same mechanism can be used in a different context to address the problem right.

Inverting the problem and laddering. So, moving problems between the abstract and the concrete that becomes a very very important approach in addressing the requirements that we have that we have defined. Many a times this technique is also called as the orbit shifting strategy.

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We will now start discussing one technique in detail, we will also discuss many techniques in detail. The first one that we are going to discuss in detail and how to do it is the reframing matrix.

Now, what it does, it mixes two approach together one that we have discussed is the role playing one the and the other one is the perspective change. Now, the reframing matrix is a tool that was created by Michael Morgan and it was published in his book Creating Workforce Innovation that helps to look at business problems from several different perspectives. So, the solutions that can be developed using this method are usually creative.

The reframing matrix provides an opportunity for people, no matter what profession or way of thinking they have to see a situation from different angles. Now, that is the USP of reframing matrix. We intend to see the problem space, the problem or the requirement from different angles. With this matrix, a person can place themselves in the position of someone else and give different observations and opinions in order to arrive at profitable solutions to a problem.

Now, there is a philosophy behind it. See when we think from the perspective of a role that we are playing for example, designer we might get stuck because of certain limitations or experiential qualities that we have. In order to break this barriers role playing; that means, looking from different angles is conceived.

So, once you take up the role of a person or role of another person who some different qualities or characteristics you tend to look up at the problem with a different perspective.

That is what we would like to bring in the table when we are trying to conceive an idea for the requirement we have at our hand.

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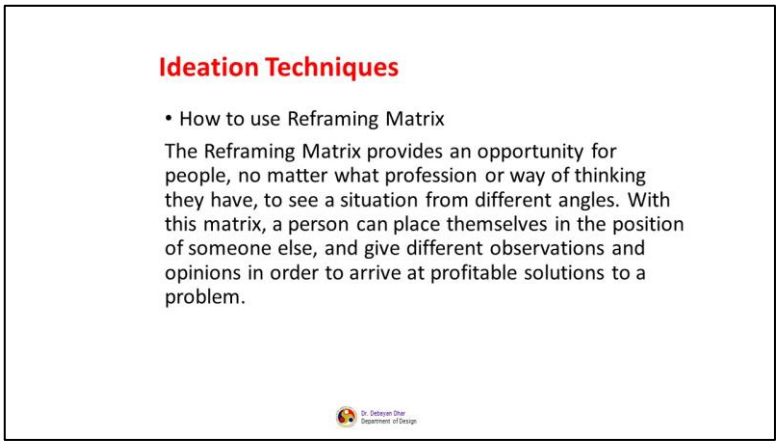

Now, how to use a reframing matrix? Now, the reframing matrix provides with an opportunity for people no matter what profession or way of thinking they have, to see a situation from different angles. With this matrix a person can place themselves in the position of someone else and give different observations and opinions in order to arrive at profitable solutions to a problem.

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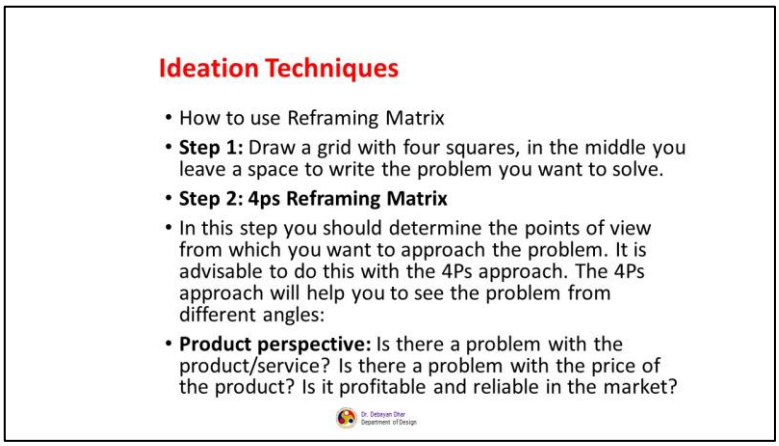

So, how to use a reframing matrix? Step 1: at the first stage draw a grid with four squares, in the middle you leave a space to write the problem you want to solve. So, the in the middle you write a problem that you would like to solve.

Then you list down the 4ps of the reframing matrix, in this step this is step number 2 in this step you should determine the points of view from which you want to approach the problem. It is advisable to do this with the 4ps approach you can use any other approach if you want as well.

Now, the 4ps approach will help you to see the problem from different angles. And what are the 4ps approach? The first p is product perspective, is there a problem with the product service? Is there a problem with the price of the product? Is it profitable and reliable in the market?

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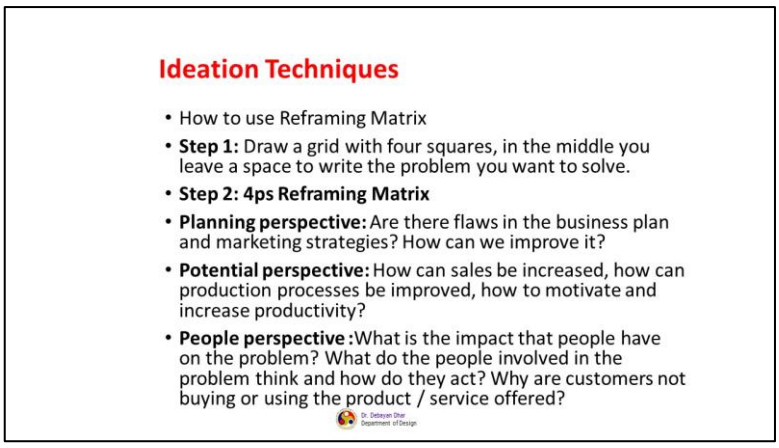

And then we have the planning perspective: Are there flaws in the business plan and marketing strategies? How can we improve it?

Third one is the potential perspective: How can sales be increased, how can production processes be improved, how to motivate and increase productivity? Note that the examples are I am quoting are from a marketing perspective, but they would allow you to understand the different perspective that each of these quadrants holds.

Then, the people perspective: What is the impact that people have on the problem? What do the people involved in the problem think and how do they react? Why are customers not buying or using the product or service offered? These are the 4ps that are being used to define the quadrants of the squad that you have drawn.

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Now, reframing in the reframing matrix you can use an occupational approach as well and that is what I am I always motivate my students to do. Now, in the occupational approach it helps you to visualize the resolution of a problem from various occupational points of view. For example, say it is not the same how an engineer or a lawyer approaches a difficult situation. So, both would see or both would use very different points of view.

So, one would have the point of view from the perspective of a lawyer, the other one will have a point of view from the perspective of the engineer. Now, with this tool you can put yourself in the shoes of a person, in a strategic way of thinking to solve difficult situations. The occupational approach can be used by one person or when working in a team as each person may have a different profession and can complement the development of a good and positive solution.

Examples of the roles that you can take, the stakeholders, your users, the CEO, the legal team, the marketing team, the finance team, the development team so on and so forth.

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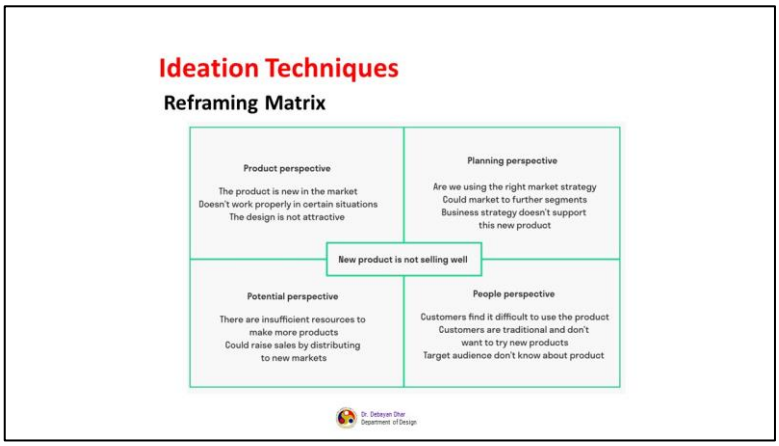

Let us see at a reframing matrix what you see in your slide is an example of the reframing matrix. In the middle is the description of a problem say for example, the problem that we have in our hand which we intend to solve or come up with a solution for is the situation that actually this is the design brief that the new product is not selling well.

Now, from a product perspective, we can say that the product is new in the market does not work properly in certain situations, the design is not attractive this is one perspective. From the planning perspective we can say that are we using the right marketing strategy? Could market to further segments, business strategy does not support this new product this is another perspective. From the potential perspective we can see there are insufficient resources to make more products, could raise sales by distributing to new markets.

And by people's perspective we can say first of all we can talk about customers. So, customers find it difficult to use the product, customers are traditional and do not want to try new products, target audience do not know about product.

And we can have many more such quadrants or such frames being named. From the perspective of design, we can talk about the design elements, we can talk about functions, we can talk about the features, we can talk about the service maintenance guys, we can talk about the pricing. We can we can see from the perspective of how the product is manufactured, how the product helps in addressing different requirements apart from addressing the primary requirements of the target users so on and so forth.

This is an example of the reframing matrix that many people or design team uses in order to visualize their problem from different roles and different perspectives.