Functional and Conceptual Design
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Lecture 09
Identifying Customer Needs

Today we will start a new topic, how do you identify the customer needs for a product. In the last few classes we try to understand the opportunity for the design of a new product. And we found that if you have an intention to develop something you will ask some technical questions and then try to get a mission statement or prepare a mission statement. And that actually shows that you have an intention to develop a new product.

So, whenever you want to develop a new product, you need to find out what the customers are looking for in that product. And once you know the customers' needs, then you can actually develop it and then sell it to the customer. So, the requirement here is to know what the customers are looking for in this new product, and how do we actually identify these customer needs. And from the customer needs, identify the actual needs that can be incorporated in the product. That is going to be the discussion in the next few classes.

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We will go with the customer needs analysis. And then we will see how these needs can be converted to design specifications or we call it as the product specifications. So, the needs can be directly put as a design specification. When the customer will say, it is easy to use. So, when you say easy to use is a customer's need , how do we make that as a design specification?

How do you bring those requirements to the customer which will make the product easy to use into the design specification or what are the things to be done in the products to make it easy to use? So, that is basically known as converting the customer needs to the specifications of the product. So, these customer needs will be mostly a subjective thing because this will be going to be subjective, that is it will vary from person to person.

So, somebody will say, it should look good, somebody will say, it would be easy to use, somebody will say it should be lightweight. Each one will be having lightweight, so what do you mean by lightweight? Depends on individuals, so for me 100 gram may be lightweight, for somebody 1 kg maybe lightweight. So, how do we actually quantify them and then make it more objective is basically the product specification.

So, we try to convert the subjective needs of the customer to objective design requirements in the product specification. So, in the next few classes, we will try to see how we identify the customer needs first and then how we convert these needs into design specifications so that is going to be the discussion that we are going to have in the next two classes.

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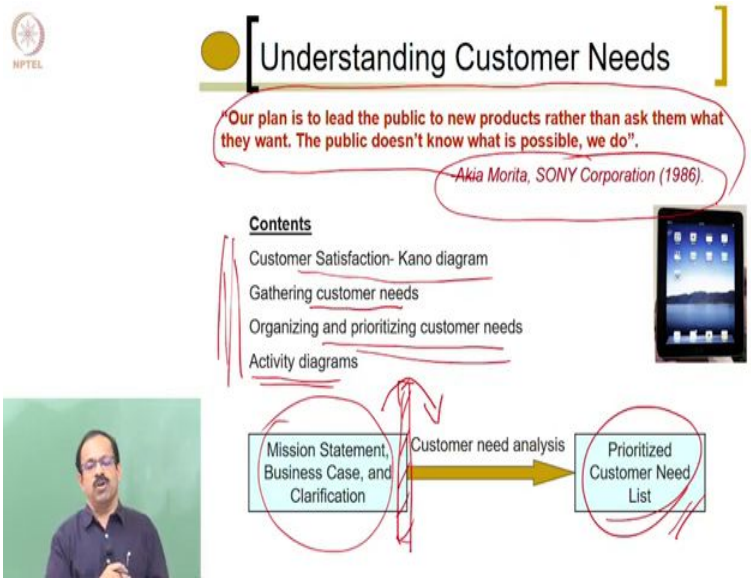

Okay, so we will look into a few things here I will come to this little bit later. We will look at how we actually define customer satisfaction. How do we say that the customer will be satisfied with the product or what are the ways in which we can make sure that the customer will be satisfied? And then we look at how to gather the customer needs, and then how do we prioritize the customer needs and what are the other things to get the needs etc., and that later will go for the specification.

So, the first part will be looking at the customer needs to satisfy the customer. So, what we are trying to do is here, we have the mission statement in business case study already. And now we have a gate, so this was the stage; now you have a gate. Assume that you have crossed the gate saying that, yes there is a good stock for development of new products.

The mission is very clear. Their profits market everything is understood, I mean to some extent you know, and therefore we go to the next stage of customer need analysis. So, from the understanding the vision for the product then we go to the customer need analysis which will

provide you a prioritized customer need list, which is the most important need, which is the least important need, you should be able to identify, so this is known as the, this is the prioritize customer need list.

So, we are going to see how we can prepare a customer needs list. The first part will look at how we prepare the customer need list; and then we go for converting these needs into specifications. So, the product design actually happens in two modes; this one will be discussed in one of the classes.

One is that the customer asks for something saying that I have a problem with this product or there is no product to meet some of my requirements. Can I have a product like this; that is basically you start from the customers and then design products? The other one is the technologists will know what is possible to be developed and then you develop it and then give it to the customer then the customer will accept it. So, these are the two problems.

So, these companies like Sony or electronic companies they normally do not go and ask people oh what do you want? Do you need a particular kind of a product? They will know what is what they are capable of. So, somebody will ask okay I need a flexible display phone, nobody will ask for a flexible display phone because they do not know it is possible. But the company which actually manufactures displays knows that it is possible to have flexible displays, foldable displays.

Therefore, they come up with the product with a flexible display or a foldable display and then give it to the customer. Customers will be very happy to accept it because they can actually fold it and keep it in their pocket. So, that is known as the technologist problem. The technologist will

know what is possible they try to develop and of course they will try to understand the customer needs even in that case also.

But, it is not initiated by the customer or the market, it is initiated by the company knowing their technical capabilities or technological know-how they try to develop a product. So, this is basically known as a technologist problem.

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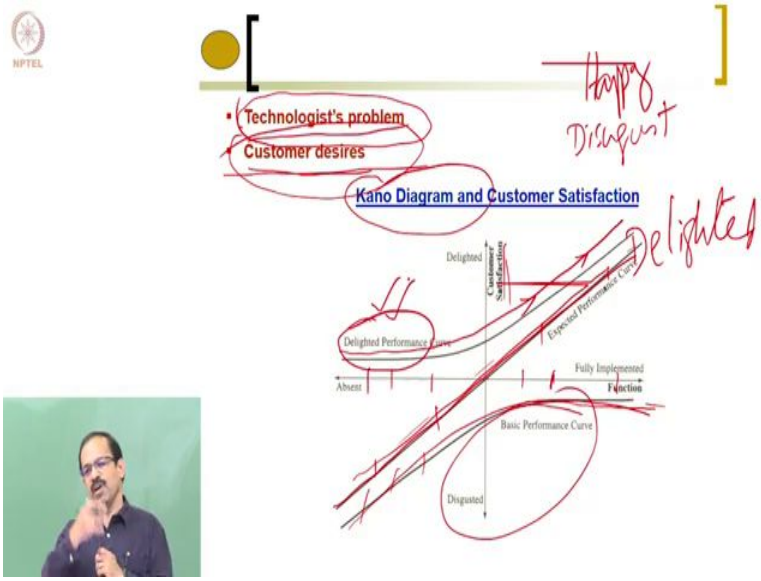

So, this technologist's problem is basically starting with the technology used to develop a product, and you sell it in the market. On the desires of the customer you develop a product that is the second mode of product development. Most of the time people are using a particular product but, they are actually not happy with the product. They find that it is really difficult to use, and that is the gap that a designer will try to fill by modifying the product, or coming with a new product.

That is basically the product is based on the customer desires. These are the two modes normally done in product development; we do not really work. We focus on this part because that actually

depends on the technology and the company. But, we look at how we actually start from the customer desires and then design a new product. So, that is the second way of designing new products.

Okay, so let us look at the customer desires and then see, how can we satisfy the customer? Any product you buy, you will be having some basic expectations of the products, right. When you buy a phone, you have a basic expectation of what it should do and if all those things are satisfied, you will be happy with the products. Yes or no?

When will you feel really upset with the product?

Professor: Pardon

Student: Not satisfied

Yes, so when the product is not meeting the basic expectations that you have; then you feel that disgusted feeling right. Oh! What a mess, why did I buy this product, it is a total mess, I never liked this, this is not to buy these conditions, these products, so that is a second one. The first one is, you are happy, you are satisfied, the second one is the first one is you are happy with the products.

The second one is you are completely unhappy, really disgusted with the products. Can there be a third category? One is that you are happy, the other one is you are completely unhappy. Okay. There can be some opportunity to buy a product; you have some expectations. But, when you bought that and you found that it is much more than what you expected. Was there any situation like that, any products?

What was the product? Mobile phone. So, you expected something it would do and then you found that it can do much more than what you expected. So, what was your feeling? Happy, you have something to say, laptop oh yeah. So, when you buy a laptop, you have some rising

expectations. But, then when you bought it and started using it, you found that it has got more features or more functionalities than you have expected.

So, you can actually call this as a third category of customer satisfaction. So, the first one is happy, the second one is disgusting or completely unhappy then the third one is you can say delighted. So, any product will have these three. I mean you can have these three kinds of satisfaction in a product. That is the product you buy meets the basic expectation that you have; that is this curve.

So, you expected that this many features and it is fully implemented, you are happy. You expected more, it is there you are happy; if it is not there, you are unhappy. So, it is known as the expected performance curve of a normal product that the customers are expecting these many features, you provide those features in a good way. Then customers will be happy with the product that is known as the expected performance curve.

That customer will be happy, if you provide all those what you expected. Because when you buy a 2000 rupees camera, I mean a 2000 rupees phone; you have basic expectations and you satisfy that. By a 15000 rupees camera, you have some expectation and all those are met, then you will be having a basic expectation. So, this axis represents the functions implemented in the product and it is not there then you will be having a, which is not there you will be unhappy with the product.

So, that is basically this one where these functions are absent and you are actually feeling very much disgusted with these products. And this one is you still do not meet the customer satisfaction. So, this is the disgusting performance curve that is even if you provide the function, people are not happy because that is not up to their expectation of the satisfaction that they are expecting.

And the third one is the delighted performance curve that customers are expecting. But, you are giving more than that they are expected, and they expected something and that is absent. But, still they are happy because you have so many other features, which compensate for that one. So, at any point of time even if you do not provide all the features the customers are expecting, people will still feel very happy with the product. Because all other features are there; they will be provided much more than what the customer asked for.

So, this is known as the delighted performance curve for a product and the manufacturer or the designer of consumer products will always try to be in this curve or they need to be in this curve. So, that you can actually keep the markets intact, or nobody will actually capture their markets. Because people will be happy with the product, they will be going for that product more and more where that product gives you much more features and functionalities that you that the customer did not really expect but you try to provide. And even if one or two are not there you will still feel happy with the products.

So, we can actually have 3 curves and this is known as the Kano diagram of customer satisfaction. You can have a disgusted performance curve, even if you provide all the functionalities, people will not be happy with the products. Because it is not meeting their real expectations and something which is the basic expected performance curve and this is the delighted performance curve.

So, if you design the products, what will be your goal? What curve would you want to be there? Naturally right. Because you want to be there on the delighted performance curve so that people will be happy to buy your products. Even if there are few features not there still people will be happy.

Why do we need to do this? Because it will be having a lot of expectations. I will be having some expectations, another person will have some expectations. It is difficult to provide all those things in the same products. So, even if some of the things are not there I still feel happy because there are many other things which I did not ask for that are known as the delighted performance curve. So, the purpose of looking at the customer requirement is to see how you can delight the customer. It is not just to satisfy the customer, but to delight the customer.

And if you want to know, if you want to delight the customer, you need to know what the customers are looking for in the product. What are the things they are expecting in the product and that will come only from the customer? So, you need to go to the customer, ask what they want and then find out what are the things they are looking for, and then what are the things you can provide and how do you delight the customer.

So, the purpose of looking for customer needs is to basically ensure that you will provide all the features in the product to delight the customer.

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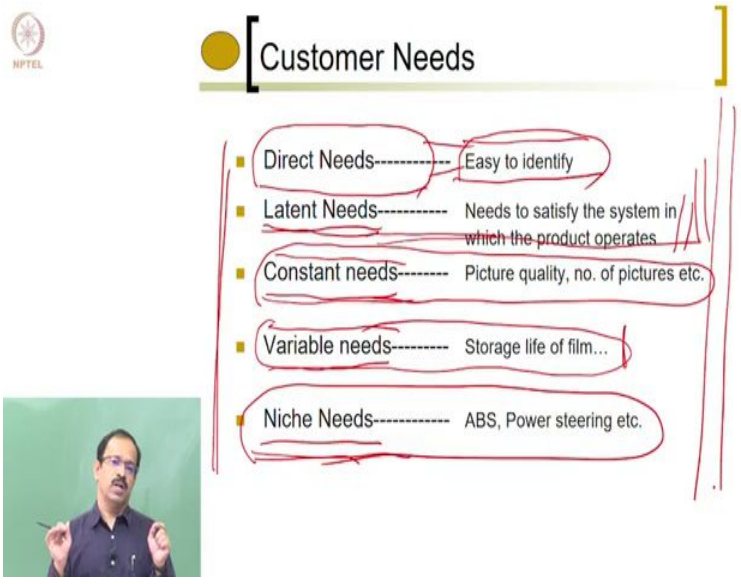

So, what are the customer needs that you can have? So the customer needs can actually be classified into 5 categories. So, these are the 5 categories of customer needs. The first one known as the direct needs of a customer. Direct needs of a customer if you ask the customer he will tell you yes; I need a 12 megapixel camera, I should be able to play video on my phone. I should be able to send messages, I should be able to connect to the internet, Wi-Fi; all those things they will be able to tell very clearly.

So, such needs are known as direct needs of the customer which were which are very easy to identify. Just ask them, they will tell you what the needs are. Probably, they may not tell you in the way the (design) designer needs the information. But, they are very clear about what they need. This is known as the direct need of a customer.

So, if I ask you, what are the direct needs of a laptop? All of you will be able to tell right. What you are expecting from a laptop all of you will be able to tell. Yeah compact, it should be compact, it should be easy to carry, and it should have enough storage. It should have enough speed of processing, it should have a particular processor. You are very clear about what you want.

So all those needs are known as direct needs which can be easily identified. But, there are many needs in a product which you cannot directly identify and they are known as the latent needs of a product. Many times customers would not be able to tell these latent needs. Only a designer can understand the latent needs. So, when you ask for a mobile phone, do you ask for the charger specification?

When you ask for a mobile phone or you buy a mobile phone or you ask for the needs of a mobile phone. Do you specify what should be the chargers capacity, charger time etc? You do

not say, because you expect that will be already there, you do not need to specify. But, then if you buy a camera, sorry a mobile phone in India and you might buy it in a European country, what will be the difference?

Charger will be different; because we use 230 Volts, 50 Hertz of power supply and our charger should be supposed to meet those requirements. But, when you buy this in Europe; they have a different voltage level, different frequency and a different plug configuration also, the socket configuration is also different.

So, are those things a customer would not be able to tell; the customer is not worried about those things. So we expect that it should be there. So, these signs of needs are known as latent needs, which says that the needs satisfy the system in which the product operates. So, only this charger is only one example but there may be many other examples about temperature, humidity condition, temperature variations, humidity, rain and all those things are there which will be not known to the customer or customer would not be able to identify as a need.

But, a designer needs to know what is the need for that particular product in a particular operating environment. So, such needs are known as latent needs of a product. Got it, what are latent needs? So, latent need would not be able to directly tell a customer will not be able to directly tell it, a designer needs to identify it from other sources.

Then other needs are basically known as constant needs; constant needs are something which will always be there. Anytime you take any product you take there will be something which is constant. For example, if you talk about a mobile phone 10 years ago, people would say good picture quality. Now, people will also say good picture quality.

But, that good has changed because it is continuously changing. So, it will be constantly there people will be always looking for a particular thing in a particular product. Such needs are known as constant needs. So, old cameras where you had the films, so there we used to have 36 films, overall with 36 films. You will be always asking for okay, I want more picture rolls for pictures in that.

And even if you provide 64 they will ask I need more; that kind of a thing. Now you are at a speed of a computer, your RAM will say oh I need 16 GB RAM; you will say oh no. If you provide 16 then I need more 32 GB RAM. So, this will keep on increasing, keep on changing; I will keep on always being there. Such needs are known as constant needs of products. Anytime it will be always there; will be constant, will not change in the future hours.

And some of the needs are known as variable needs; that actually changes with the products. Some cases it may be there and the product changes that need may completely vanish. For example, if you had something like a CD drive in all the laptops, all the computers. The laptop had a CD drive; the desktop had a CD drive. But now nobody has asked for a CD drive, most of them will be happy with a USB drive.

So, these are the needs which change with the changing technology. So, you need to know when you develop a product, you need to know which need is going to be changing in the near future. And then accordingly you have to provide a feature, so that your product can be updated at a later stage. So, such needs are known as variable needs of a product. And the last one is known as the niche needs.

Niche needs are very specific to specific products, not applicable to all the products. When you have a particular product to be operated in a particular environment then only that need comes otherwise there is no need for such a feature. For example, somebody is manufacturing refrigerators, so normal refrigerators we know all will be having specific requirements.

Specific needs like you know operating temperature should be from 0 to 25 degree or something like that. But, there may be a chemical lab or a research lab, they say no, my refrigerators should work from minus 50 degree to 20 degree. So, that is very specific to that particular product for a particular application such needs are known as niche needs of a product. And this is applicable to power steering, ABS etc., because when you apply power steering for a particular type of vehicle, there may be a particular requirement.

Similarly, ABS Anti-Lock Braking System, you try to apply in a commercial vehicle compared to a light vehicle or a heavy vehicle. We will see that there are some differences which are very specific to that particular vehicle. Suppose you have a 12-wheel vehicle which is a very long vehicle and a very concise vehicle. It is ABS, maybe different from the normal ABS, and very specific to that particular vehicle you can identify some needs.

So, such needs are known as niche needs of products. So, you can see any product development, it is important to understand all these needs to satisfy the customer. Because if you are not taking care of some of these needs then you are actually not satisfying those customer segments and people may not be happy with the product.

Not necessary that you satisfy everyone but at least you should know what people are looking for. Then you can decide which one is more important, which one is best important accordingly

to provide the product. So, these are the customer needs that you need to identify for a new product development.

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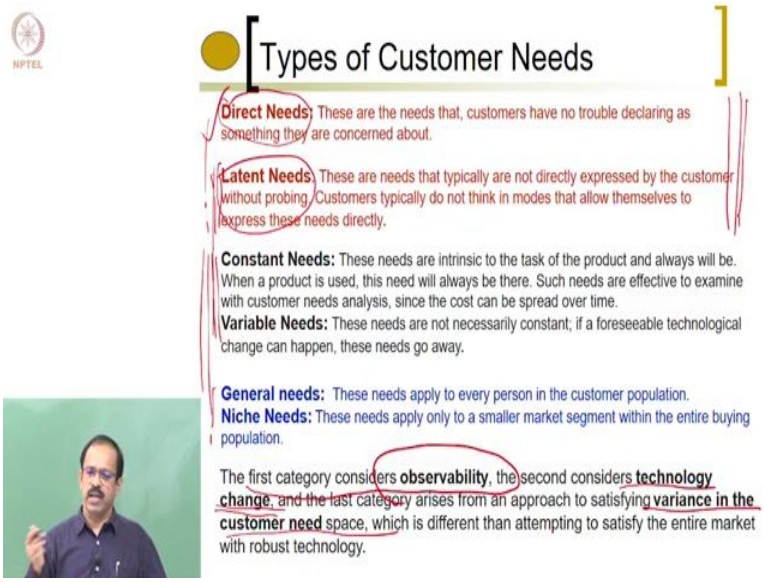

So, I explained all these things, I am not going to again. So, this so the first category considers the observability that is the direct needs comes from the observability of an individual. So, you can observe and then say these are the needs. When I say a particular product, I can clearly tell these are the things I need because that is easily understood by observing the things. The second consideration is the technology change and the other category comes from the variance in the customer needs space.

Because there are a lot of people and there are a lot of variations in the customer segments, and that actually comes from this one. Thus, as the customer segment varies we will be having constant needs and variable needs change. So, you can say sorry this one, the niche needs, this is the second one, which is coming from the variance in the technology. Thus constant needs and variance needs.

So, in a customer in the product development exercise to understand the customers you need to look at all these needs and then see how you identify the needs. And that is the first stage in product specification development that is you identify the customer requirements and then say convert these requirements into objective design specifications.

Got it, the 4 types of needs; the first two are important then the direct need and latent need are the most important part here because they are the most important. Which one affects the observability of the product? The other actually decides more on the designers to understand the technology change and it's concise. So, the question is now, what are the ways in which you can identify the direct needs and latent needs of products. How do we identify this in a systematic way?

You can actually simply ask a few people and then get it or I can have a very systematic way of identifying the customer needs. So, this is what we are going to discuss. What are the ways in which we can identify the customer needs?

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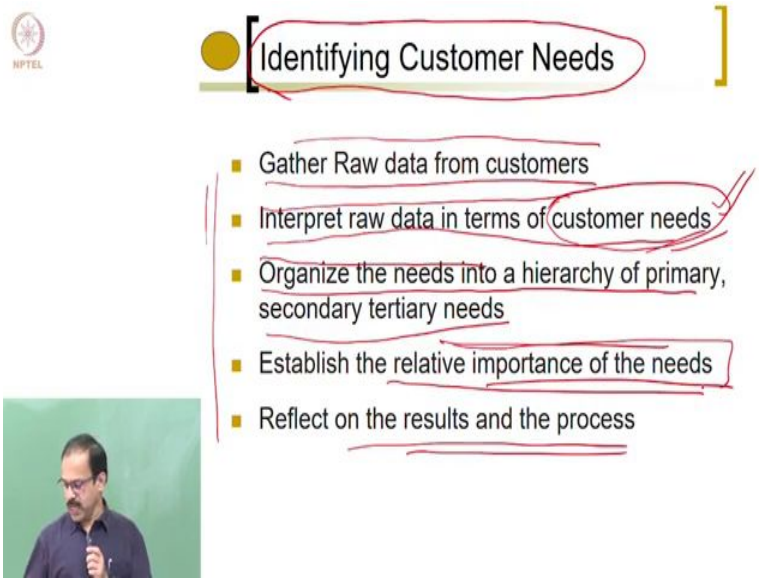

So, there are few steps involved in this one. Now, identifying the customer needs; the first part is known as gathering the raw data from the customers. And customer data I mean customer needs can come only from the customer. You cannot sit in a room and then interpret or predict what will be the requirement of a customer. So, you need to collect the raw data from the customer by going to the customer and asking the customer, what actually you are looking for in these products.

So, that is known as the raw data collection; so, the raw data will be in a very raw form, the customer will say, oh this is too heavy; so you ask him, you will say it is too heavy. That is his requirement or he will say it is difficult to carry. So, these are the things customers will say and then it is your job as a designer to see and to interpret this data and then say, what is the actual need the customer is talking about?

When he says, it is difficult to carry, you need to find out if it is because of the size, is it because of the weight or is it because of its appearance. What is that makes you feel uncomfortable in

carrying the products. So, that is basically known as interpreting the raw data in terms of customer needs. So, you have to interpret what the customer is talking about and then write down what is the actual need he is talking about.

And when you talk to 100 people, each one will give you 20 needs. So, you have 2000 needs now. What will you do with all these two 2000 needs? Just raw data when you have many people a lot of data will be generated. You convert all these data into customer needs and then what you need to do is to organize the needs into a hierarchy of primary, secondary and tertiary needs.

So, what are the most important needs? What is the secondary need of the customer? What is the tertiary need of the customer? This one you need to organize well and then establish the relative importance of each need. Which is the top most need that should be satisfied? So, you have to rank them 1, 2, 3, 4 etc., and then say that this is the needs that should be satisfied in the products.

At least it should identify around the 10 products, 10 needs that customer is looking for or customer is interested in. And then reflect on the results and then see whether what you have understood is correct or not. This is the process for identifying the customer needs. So, you are trying to identify the customer needs first by collecting the raw data from the customer and then interpreting the raw data in terms of customer needs.

Then third, organizing the needs into a hierarchy and then deciding which the most important needs is. And this is what you need to do as a designer in order to design a new product in order to develop new products. Any questions? Are you able to follow, yes or no? Okay. Please stop

me in case you have any questions or you feel that okay something needs more explanation. Alright so let us move to the method by which we do the collection.

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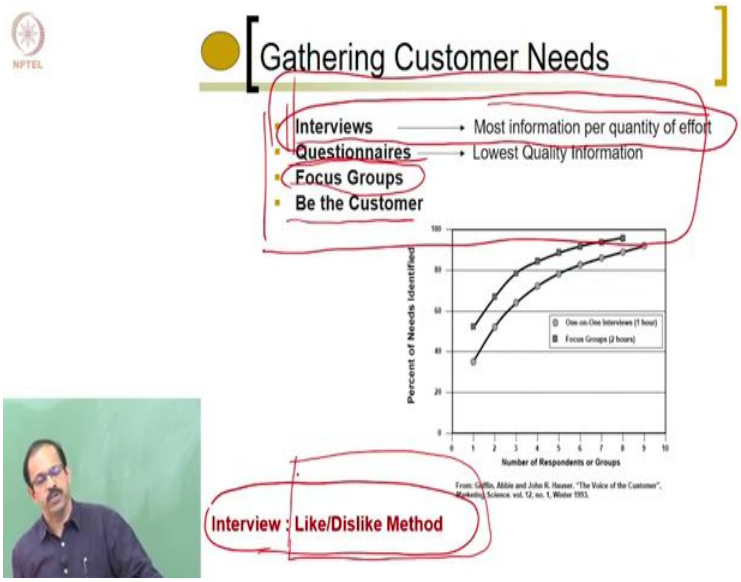

So, as I told you, gathering the customer needs; the first one is basically getting the raw data. So, raw data can be collected either through interviews, you go and interview the customers. And that is known as the first method of collecting the customer data from customers. The requirements of the customer can be obtained from interviews or you can prepare a questionnaire. Send it to many customers, ask them to answer this and then give it to you.

That is the second one known as the questionnaires. The third one is known as the focus groups, that is you call some particular group of people to a meeting, talk to them, ask those questions and then collect the data. That is known as the focus groups. And the last one is known as the, be the customer. You imagine yourself as a customer and then try to answer the questions.

If I am a customer for this product; what will be my requirements? What are the needs I will be having in these products? That is basically known as, be the customer. So, you can go for any of these methods to collect the data but the most information per quantity you will be getting from interviews. You can interview the people, ask questions, record the information and then look at

what they are looking for in this product. This is known as the interview method of data collection.

So, I will be looking at how we do this interview method of data collection. We will not be looking at the other methods, this is the most efficient way of doing it. We will skip this and one of the methods for interview is known as a Like/Dislike method of interviewing. You go to a person and have a particular format which we call a Like/Dislike method of data collection. And ask these questions and try to find out what are the customer requirements we will be having.

If you ask directly what you need in this product; they will not be able to tell you clearly. But, if you be more specific or clearly ask questions and they will be able to tell what kind of needs they have. So, these methods like dislike methods help you to identify the customer preferences, customer requirements in a direct way by asking questions. So, we will see how to do this method of like dislike methods, let me skip this.

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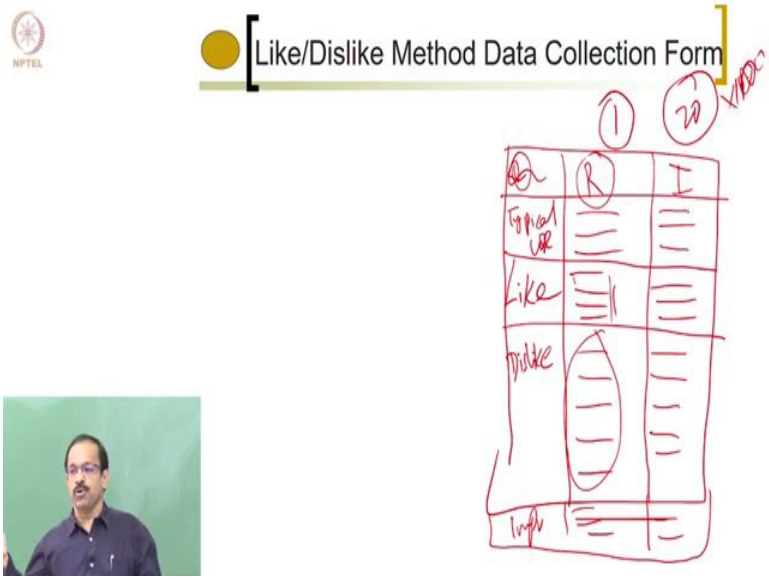

So, this method is a simple one, what we will be having, you will be having a paper with few questions in this one. That is you will be asking the customer some questions and try to assist the answer from him. And say okay this will be the questions you will be having, and this will be the response of the customer and this will be the interpretation of the designer for you. The question will be, what the typical uses of these products are or typically what purpose you use these products that is known as the typical use, typical use of the product.

For example, if you are interested in buying a product I can take for example, okay let us take a cycle. What are the typical uses you have for your cycle, this is a simple question right. You will see how I use it to go from hostel to college class and come back and as these are the only one you are doing. Now sometimes I use it for roaming, sometimes I use it for carrying things from the shop.

Sometimes I use it for carrying my friends whether boyfriend or girlfriend I will be taking, my friends for a ride. So, these are the different uses for cycles. So, each use clearly tells that there is a particular need for that. When you say that you are using it only for going from class to hostel then you do not need to have a second seat in the cycle, or you do not need a carrier in the cycle.

But, when you are trying to take this for carrying things then the question comes, what would be the weight of the person you are carrying is it heavy or it is a light person? So, these are the questions that will be coming. So, typical use of the product becomes important because that actually tells you what are the basic requirements that you will be having in that particular use or particular customer needs.

Then, you will ask okay, are you using a cycle now? Yes I am using a cycle. So, what do you like in that product? What are the things you like about this particular cycle? You have products

whatever the product is you ask. What are the things you like? So he will say, oh it is looking very good and it is very robust. I mean I do not need to do servicing.

I can carry weight, feel the number of people can actually be 2-3 people easily, I can take 2-3 people, and the pedalling is very easy. So, you will be getting a lot of answers for this from the customer. So, that tells you if you provide these kinds of features, customers will be happy. That is the need of the customer. Then you ask what you dislike, what you dislike in the products? So, what do you dislike in your products in the cycle? What do you dislike?

Sometimes the chain comes out and you have to put continuous efforts and you have to clean it, oil it frequently. So, these are the dislikes he will be telling. Then you ask, do you have any suggestions for improvements? Do you think this can be improved in a different way? That also tells him, okay. He is looking for something different in existing products so you write down that also. So, all this tells you these are the customers' requirements or these are the things which customers do not like that should not be there and then you interpret.

What is the actual need the customer is talking about and this becomes the needs of this particular customer. So, you have one Like/Dislike form you will be getting at least 20 needs from the customers. Good is for 100 customers; you will be getting 20 into 100, 2000 customer needs you will be able to get. That is the importance of having a questionnaire and asking questions for getting the customer needs. So, this is known as the Like/Dislike method of customer need identification.

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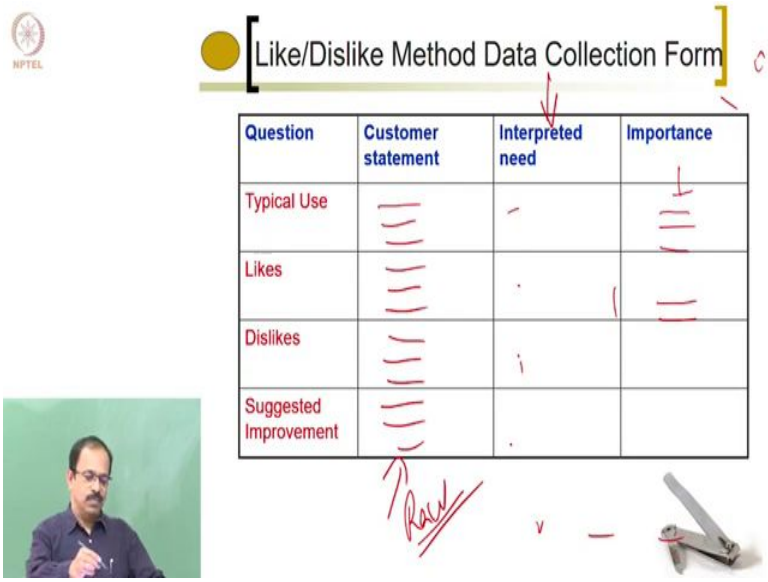

So, this is the format; question, typical use, customer statements, likes, dislikes, suggested improvements. So, customers will be giving you all this information. You can note down all the information, so this is known as the raw information. Raw information that you get from the customer and then you interpret the needs what the customer is asking for and then you can give the importance.

What it is really needed or what the customer says, it is an optional one or is it really needed. So, this kind of information you will get from the customer. So, this is known as the Like/Dislike method of data collection from customers. So, can you answer this question for this product now?

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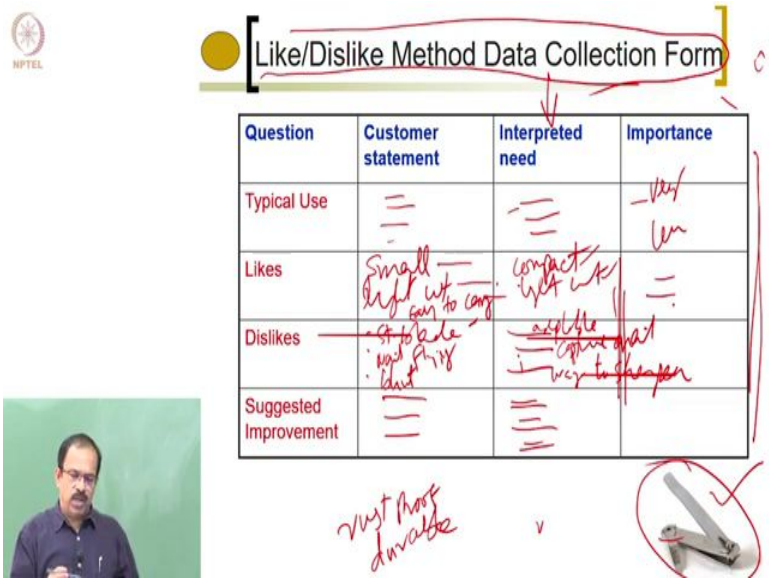


Suppose I am doing an interview to redesign these products. We can actually identify all the customer requirements by asking these questions.

What do you like in these products? Typical use you will be having okay cutting nails or polishing nails. What are the likes you will be having for these products? Size, okay small. Then lightweight, okay lightweight, what else? Easier to carry, yes. Anything else? Rust proof, I will write somewhere here, rust proof.

Student: Strong

Professor: Pardon. Strong, it is very strong, so it is durable. So, these are the needs that they like. So, basically it says that when they say they like it because it is small, there is a need that it should be compact. That is what the customer needs we can interpret. Lightweight basically lightweight only there is nothing which is direct, easy to carry. What is the need here when it is

easy to carry? Both of these are right, I mean it is compact and lightweight and it should be easy to carry.

So, you do not need to have a separate need for this; because it says it is compact and lightweight it will be easy to carry. Similarly, dislikes; what are the dislikes you have for these products we already talked about this. So, the straight blades right, straight blade is a problem, there is no storage weight, nail flying, nail fly away, getting blunt, so these are the things which you can say, and these are the dislikes.

Now, you interpret this, when you say straight blades. So, basically people are saying that the blade should have the shape of the nail or the nail the blade what is provided should have a capability to adapt to the nail shape. That is what you can actually adapt, so it is an adaptable geometry or shape I can say. And nails flying away; probably they are telling that there should be a mechanism to capture nails.

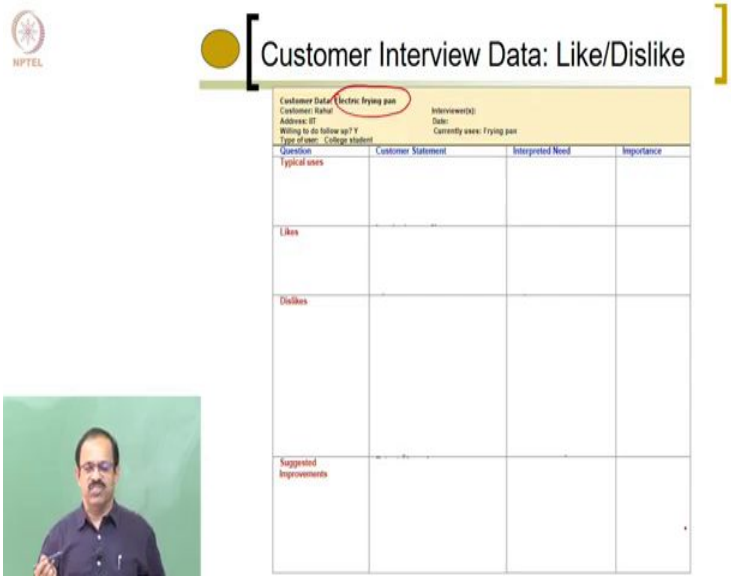
Blunt, probably a way to sharpen once it is blunt. So these are the customers' requirements. Okay, my handwriting is not that good but I am just explaining to you. So, these are the needs that you can interpret from this and then you can have many needs here. Similarly, suggested improvement they will tell something and they will tell something here and then you interpret here as the needs.

So, this way you will be able to get a lot of needs identified in a Like/Dislike method of customer interview. And like this will be having many customers, so each customer will be giving you needs. Some of them may have the same overlapping needs but you need to correct it to exist from 50-60 people depending on the product. And all these needs will form the basis for sorting

the need and finding out the actual needs of the customers. So, this is basically the Like/Dislike method of data collection. So, I have an exercise for you.

Student: Important

Oh yeah, importance range again once you have this you can write which one is most important, very important, less important like that you can write down. And later on you can convert that into 1, 2, 3 etc. So, here you should say, no optional should be there, must be there etc.,etc. (Refer Slide Time: 42:19)



So, what I will do I will take an example in the next class and then tell you how to actually do this exercise and find out the customer Like/Dislike for an electric frying pan. Yes, meanwhile you can do Like/Dislike methods; so what you like in this class, what you like in this FCD function, conceptual design or teaching.

What do you dislike? What are your suggestions for improvements? Whoever gives the best, so if you are interested, it is not a compulsory assignment. If you are, I will be asking you to do this later but if you feel that it is important to give the Like/Dislike. Please feel free to give your likes-dislikes and your suggestion for this course. Okay we will stop here