Functional and Conceptual Design
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Lecture 10
Customer Need Analysis

In the last class we discussed, how to identify the customer needs, what is the importance of identifying customer needs and what are the steps involved in identifying customer needs?

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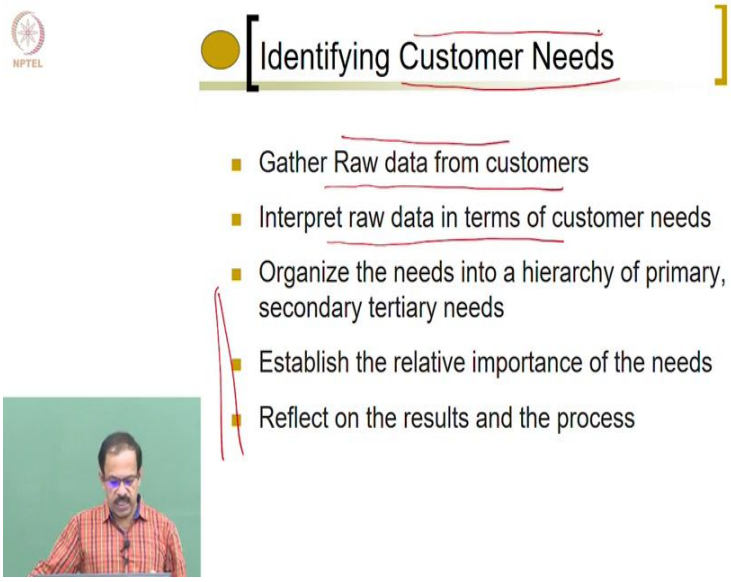

The first part is basically how to gather the raw data from the customer i.e. what is the customer expecting? What is that he actually wants in the product to be told in his own words. This is known as the raw data?

The raw data need not be in terms of the customer requirement of the product design. It will be the customer's point of view, what is the requirement he has. And the next part is that you interpret the raw data in terms of customer needs. So, this raw data needs to be interpreted as the customer's needs and this is the job of the designer or the person who is interviewing, for identifying the needs.

This raw data from the customer needs to be organized and establish the importance and then reflect the results and finally find out the actual needs. This is the process to be followed in identifying customer needs.

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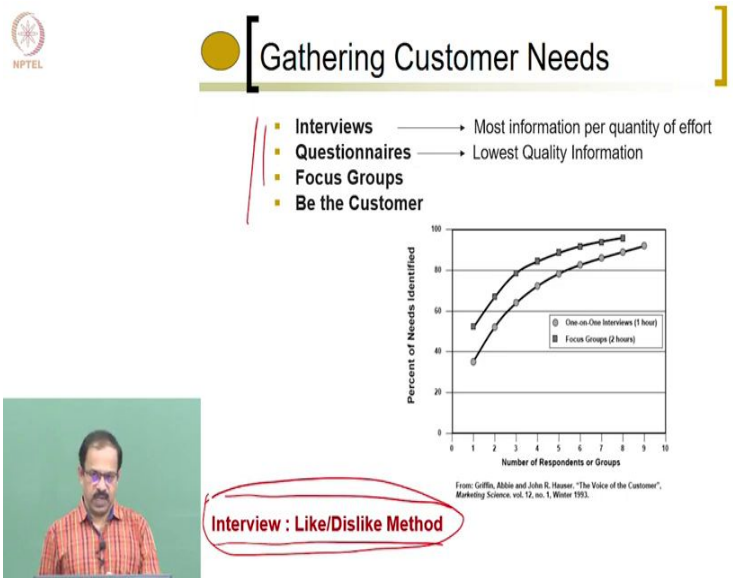

And then you found that there are some standard methods to do this. Like you can do interviews, do customer questionnaires, focus groups, customers be the customer. These are the different methods that can be employed in order to gather customer needs. First we look at the method which is known as the Like/Dislike methods. This is one of the methods we discussed as the proposed way of getting the customer needs.

So, we need to find out what customers like, what the customer dislikes and based on that identify the needs of the customer.

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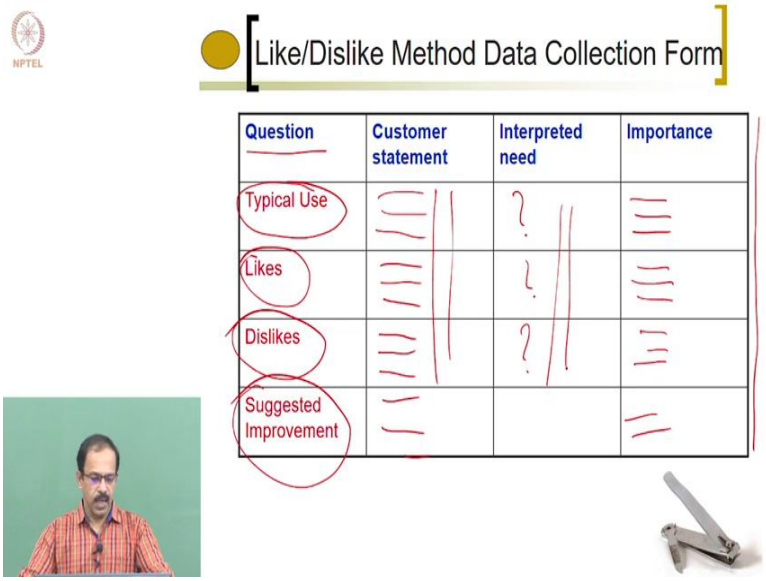

This is the format by which we can collect the data from customers. So you have typical questions like what is the typical use of the product? What are the situations or what are the typical applications the customer will be having about this particular product? And then what he likes about the product? if it is an existing product or is it an imaginary product? what are the features, what he likes and then what he dislikes about the product and then suggested improvements.

By asking these questions, you will be getting a lot of customer statements. And these customer statements need to be converted or interpreted as a customer need. What actually the customer is asking when he says “is it to use?” or he says “I like it in a light weight”. So you need to understand what actually the customer needs in that particular situation. That is how you interpret the need.

And then give the importance, basically either the customer will tell if it is important or not important, or as a designer you can decide which one is most important according to the customer. Since this is an interview you will keep asking questions and will try to gather the information and then see whether it is most important, less important or it is an optional one and that also you will be writing here. So like this if you will interview a large number of people, you

will be getting a large set of raw information as well as the needs and that is the first step in getting the customer needs.

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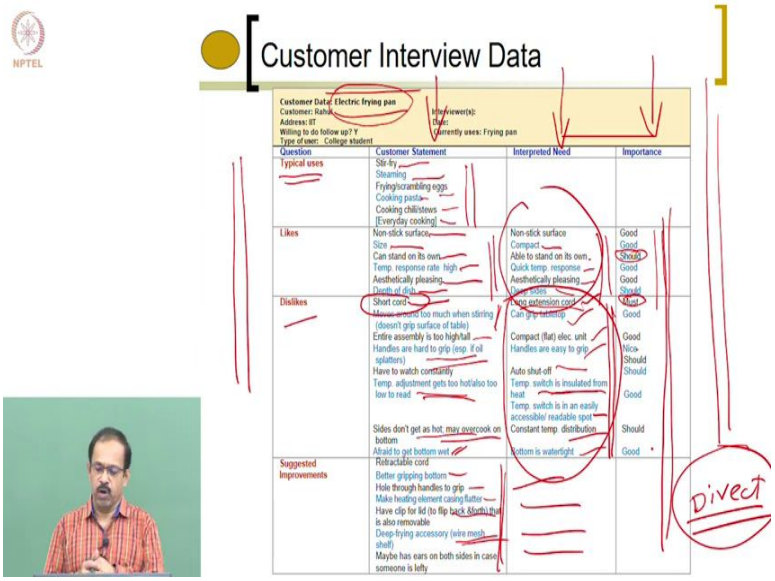

We will take an example and then see how this actually can be generated and how do you interpret the needs. We will take the simple product which is an electric frying pan. All of you know what an electric frying pan is? Yes or No? Yes. This is something the company wants to redesign or they want to come up with the new product, but they do not know what exactly should the size, quality, cost they are not sure about all those things what customer is looking for or if the customer is already satisfied with this product and they will be able to come up with the new product. So they want to find out what the customer needs for this product, if they want to bring such a product to market. So they will do a customer interview, using this Like/Dislike form. And the question will be like "what are the typical uses you have for this product". Customers should tell you have a frying pan, what are the things you use it for or what are the applications you have for this frying pan.

What are the applications you can think of using a frying pan? Making Maggi, then that is all, beat people, good experience it seems. Then you can fry, you can prepare the fish, chicken, or whatever you can make curry . So there are many things, somebody will be using it for. Deep

fry, somebody will use it for boiling things, or somebody will be using it for cooking food like fried rice or something like that.

So basically, there are multiple applications, not a single application and if you are using it for beating somebody then the requirement will be different. So the typical applications, you will be able to get from the customer, the customer will say, I will be using it for stir- fry, I want to fry something, I will be using it for steaming, I will be making scrambled eggs or fried eggs or making an omelet. And cooking pasta or cooking chilly/stews and something every day. So there are a lot of other things you will be able to see.

So basically, it tells the designer that it is not a single application, there are multiple applications for this and somebody will be using it for deep fry, somebody will be using it for boiling also, So both applications are there. And therefore, you need to think of size, shape and the dimensions, etc. based on these requirements. So these are the customer statements. So the interpreted need is that it may be used for multiple applications. It should be capable of doing stir fry, it should be able to do cooking, and sometimes it may be used for stews like soup or something like that. So, all those things become the interpreted need here.

Now, what are the customer likes about this product? So he is already using a product, it is not a completely new product. So he has some applications and he likes something about the existing product. So what is he actually liking about this product? That is the question.

Then, he says that a non-stick surface is something which he likes very much because it has a non-stick surface. And therefore, it does not stick on the pan. And it is very good quality so he likes it. And the size also he likes it, it is very compact and it is not very huge. And then it can stand on its own, very interesting thing. Basically, it says that just keep it there it would not tilt or it would not top it. So that is something which the customer likes.

Similarly, the temperature response rate is very high. That means actually it heats up very fast. That is the thing which he likes. And then it is aesthetically pleasing and the depth of the dish is also good. That means it has got enough depth so it will not come out or it will not spill leading to ruin your cooking. So these are the things he likes about this product.

So what can you interpret from that? We need to keep these features in this product then only the customer will buy. If you do not provide these features, the customer would not be interested in buying this product so he may not like it. And therefore, we need to have these as the interpreted needs of the product. You can write it in your own words or in your own way. What should be the requirement? So one is you should have your non-stick surface, it will come to the interpreted need later.

So let us look at the dislikes first, so ask the customer what you dislike about this product. What are things you do not like in this product? The cord length is very short so you need to keep it very close to the plug point. You cannot move it away from the plug point so that is something which he does not like. And it moves around too much when stirring, so though it is stable it can stand on its own, when you try to stir the contents. It actually starts moving, so that is something which he does not like.

And the entire assembly is too high or tall, that is something looks like the height is slightly more so it is not that good for him. And handles are hard to grip, the handles are provided but it is not very convenient for the user, that is something that he does not like in the product. And then temperature adjustment gets too hot, also too low to read. That is the temperature adjustment knob sometimes becomes hot so it becomes difficult to adjust the temperature or sometimes very difficult to read the marking on the knob. So these are the things which he does not like, and the sides do not get hot, may overcook on the bottom. The distribution of temperature is not uniform. Bottom has got a high temperature and the sides temperature is less.

So there is something which I do not like and am afraid to get bottom wet. So at the bottom if you make it wet then there may be a problem with electricity because of the electric one. So they are afraid of electric shocks and other things, that is why they are afraid to get the bottom wet. So the customer says these are the things he does not like in the product.

So what does it mean? When you design a product, you have to make sure that these things are addressed or you are actually addressing these issues so that customers would not have these

kinds of problems. So that is the interpretation that you can get from here and accordingly you interpret what are the needs that you can put some here.

And suggested improvements you ask. So the customer will tell many things, retractable cords so that you can extend the cord and then retract it. Better gripping bottom, handles to grip, proper gripping handles and make heating element casing flatter. That is you can have a more casing flat so that the temperature distribution will be uniform and have a clip for the lid, so that you can take out the lid very easily.

Deep frying accessory so if you can if you want to do it for something else so you can have some kind of accessory you can actually put on the lid and you can do the deep fry. So some kind of accessory to add on to the product. So that you can get better utilization of the product. And may have ears on both sides in case someone is lefty. That is basically, you can actually hold it properly and have ears on it, that is you can actually take it with one hand and then.

So these are the suggestions from the customer. So it is not necessary all these suggestions are very good; all the likes and dislikes are hundred percent perfect. So it is up to the designer to see which one is important which one is not important. So he will be looking at these things and trying to interpret the needs. What are the needs you can identify from this?

For example, the interpreted needs from the likes will be non-stick. It should be compact; the size is the important one. Customers say size is an important thing. So it should be compact, it should be able to stand on its own. It should have a quick temperature response, aesthetically pleasing and deep sides. So these are the things which should be there in the product.

Similarly, by looking at the dislikes, you can actually identify the interpreted needs and then say that it should have a long extension cord. That is a need of the customer, he says the short cord, he does not like. So, basically tell that there should be a long extension cord. Similarly, can grip tabletop, compact electric unit, handles are easy to grip, auto shut- off that is basically to I mean overheating or the bottom gets overheating, that condition can be avoided by having an auto-shut off.

Temperature switch is insulated from heat that means it would not get heated up and at an easily accessible/readable spot, constant temperature distribution, bottom is water tight. So these are the customer needs that you can identify from the dislikes. So from likes you can get a lot of customer needs. Similarly, from dislike also, you can get a lot of customer needs. And then again looking at the improvement suggested that also gives you some needs over here.

So, long extension cord is one requirement. But retractable cord is another requirement. So you can have a long and retractable extension cord would be the requirement for this product. So this way, you will be getting a lot of customer needs. And then here you can decide whether it should be good, should have, good to have, or desirable to have like that.

Must have, nice to have, should have, good to have. This is the way you classify it, you can either give numbers like one, two, three or you can say, it should have something, it should. These are almost the same. And then you have good to have, nice to have. Nice to have not to have always . If you can provide it that will be. So this way you will be creating the needs list with the interpreted need. And then the importance of this particular product.

So this is the way how you use the Like/Dislike form to gather raw data from the customer so this is the raw data. And these are the interpreted needs of the customer and this shows what is the importance of this. Now, if you do this for one customer. So that customer need not be the perfect customer or he may not be always using it perfectly. And for you need to go to many people and then ask them, what are your likes and dislikes?

Many things will be common, many things will be, there will be something which will be new. So you need to get all these customer data for maybe fifty or hundred people. And then at the end of this you will have a large set of customer needs which need to be analyzed to see what the actual customer is looking for.

The next step is basically to analyze all these data. The first one is to get the raw customer data from using the interview method or the like/dislike methods. Any questions on like/dislike methods? So, we discussed many types of needs in the previous class. What are the types of needs? Direct needs, and Latent needs - these are two major categories, we can say. Direct needs

and latent needs so when you ask these questions what you are getting is the direct needs of the customer. How do you get the latent needs of the product? Is there any way to get the latent needs?

So the questionnaire kind of like/dislike or interviews will give you the direct needs which the customer can identify. That is basically the direct needs the customer is having no difficulty in telling these things. That is the direct need of the product.

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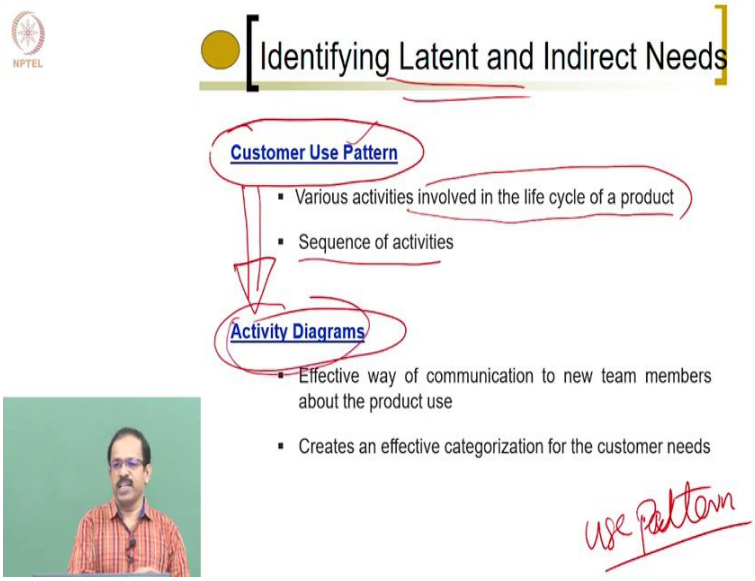

If you want to get the latent or indirect needs of the customer, there are few things which we need to do, not directly with the customer but more looking at the life cycle of the product or the use pattern of the product.

We call it the use pattern of the product. How is the product used by the customer? And if you can go through all those stages then you will identify what are the latent needs of the product? Or what are the things the product should satisfy if it has to work in the particular environment or particular system. So that is what the latent needs. So there are multiple ways.

So, one is basically by looking at the customer use pattern. Various activities involved in the life cycle of the product and the sequence of activities. So, how the product is being used by the customer not only on a daily basis, but from the date of the purchase of the product till he

disposes of the product. What are the things happening in between and if you identify all those steps then you will be able to identify many needs which are involved in the use of the product? So that is basically known as the customer use pattern and identifying the latent and indirect needs.

So, one of the methods to get this information is known as activity diagram, that is use pattern can actually be identified by using an activity diagram of the product. Activity diagram basically tells what are the activities involved in the whole life cycle of this product when it comes to the person or when the customer is getting associated with the product, what are the various things happening and diagram of all these activities is basically the activity diagram.

It is nothing complex here, a very simple one. What do you do with this product? That is the simple question. And then you try to make it as a diagram. And then you will be getting all the activities and that will tell you all the needs of the product or the latent needs of the product. For example, let us take a product.

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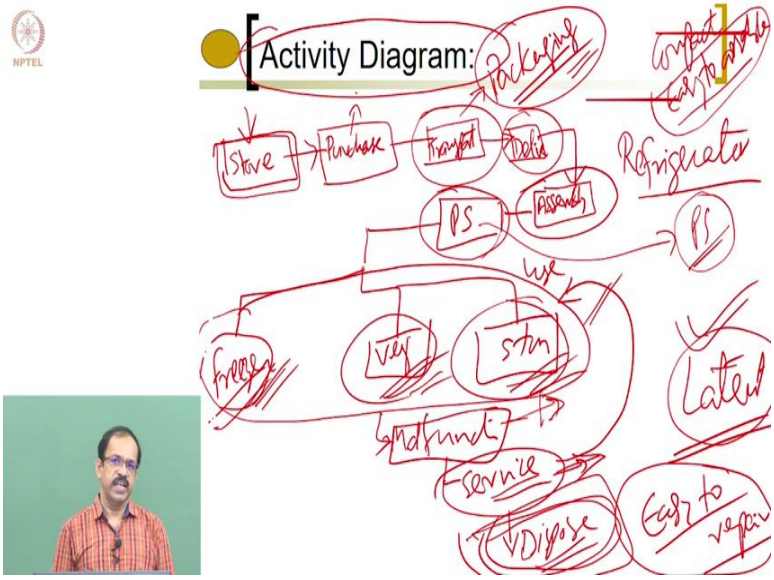

Assume that we are trying to redefine redesign refrigerator. It is a very common product lots of you know what is this. All of you know what a refrigerator is and what it is used for. So now we want to find out the latent needs of this product which customers would not be able to tell but as

a designer you will be able to identify what kind of things are involved. So instead of going to each step separately we will look at what is happening in the whole product.

So if you are a customer for a refrigerator, what is the first stage when you get associated with the refrigerator? So what is the first step in so what is the first step instant where you get connected with that particular product? Pardon? Delivery, so first is delivery. Sure, and who will buy it?

You have to buy it first, then only delivery comes into picture. So, first maybe you will be going to a shop now because of the online, it may not always be true. But you will be having a store where the customer will be going and then he will go through all the available ones. And then purchase the product. And the purchase decisions may depend on many things like the size of what he is looking for, what is the cost range he is looking for, did he have preference for a particular brand. All those things are involved. So he will be purchasing this product.

Then what will happen? Yes, I can hear something. What is this? Delivery, so what is happening during the delivery, setting of bills, that is coming second, so you purchase it. You do not carry it in your bag. So, there is transportation involved. So you transport it and look very trivial at all these issues, but then there are some things which come as part of this activity and needs of the customer and needs of the product.

So you transferred it and then it will be delivered. And then what will happen after the delivery. Installation or will be having what we call this as assembly. The product will be having multiple parts so it has to be assembled so there is an assembly involved and then connect the power supply. So you connect the power supply and then start using it, that is what happens.

So what are the uses you will be having? So you will be having a freezer, you will be having normal vegetable storage, and you will be having other storages also. So this is the way you will be using it so basically will be this can actually say use the product. So all these things can be considered as using the product.

Now is that the end of the story? No, what will happen? What are the other things involved? Not able to hear you. Maintenance, so sometimes it goes back. So malfunction may happen. So then

there is a service and after service it will go to use again. So it will start using again after the service. Now again it goes malfunctioning what will happen? You will say it cannot be repaired, so what will you do? You have to dispose of it.

So the activity diagram is nothing complex. It is basically looking through the various stages involved in the customer getting associated with the product and trying to see what is happening in this stage. And see if there are specific requirements you can identify during each one of these stages. Then that becomes your latent needs. So this is not the customer is not telling you anything. But you are actually looking at the product life cycle and then trying to see what is to be done. So what kind of needs you can identify from here. So it has to be stored in the storage.

So one need, we can say it is a latent need in this case, basically it should be a compact one. So if you make it bulky you need to make a large storage space. So, it is always good to make it very compact. Not from the customer's point of view, but from manufacturer, seller's point of view, it should be compact. So, that is something you can identify as latent. But it may be true as a direct need also. So it is not that we are not going to get any additional information.

So purchase also you can say, people will purchase based on the features and the cost. So again, needs will be here, it should be low cost, features, etc so not necessarily latent needs. So, you do not need to worry about that much. And something it is a customer would not be able to tell you about transport. He is not worried about how you transport it. He is worried about it as long as it comes to your house. You are happy with that.

But it says that there is a transportation involved in the product life cycle and therefore two things, one it should be lightweight and other one the packaging should be proper, so that it will not get damaged during transport. So, one of the latent needs comes that it should be easy to transport or it should not get damaged during transport is one of the latent needs which the customer is not worried about.

Customer says as long as it gets in my home, I do not care. But this is the manufacturer's responsibility or designer's responsibility that it can be easily packaged and it can be easily transported. That becomes one of the latent needs of this product. Now, delivery there is no

specific things, especially that packaging is good and it is light weight it can be easily done. So here also that light weight comes into picture because of the delivery and transport issues.

What else? The next stage is basically an assembly of the product. What is the need here, latent needs? It should be easy to assemble which the customer would not be telling you. There is no it is not the direct need of the customer to be easy to assemble. So, easy to assemble will be one latent need you can identify. When you say easy to assemble, what actually you mean? Less number of parts, easy narrow feet, no need for a large number of rules.

So these are things, easy to assemble. But we normally look at it from a design point of view, easy to assemble is the requirement. How do you make it easy is the next question that we answer later. So if you do assemble is the requirement.

And then connect to the power supply. What is the requirement? It should be, you have to look at what kind of power supply the customer will be having. Is he having a, is it in India, or is it in Europe or in the U.S things are different? So you have to look at which country you are going to use and what is the latent need of the power supply in that particular country or a particular region. For example, in places like in villages and all if you are using it, there will be a lot of power fluctuations. So you need to look at if there is a power fluctuation, then you have to provide appropriate stabilizers or in built stabilizers or external stabilizers.

So that becomes another latent need. So, how do you adjust to the power fluctuations in that area. And what kind of power supply, 230 volts, 110 volts, 50 hertz or 40 hertz. That also becomes the latent needs here. And then you look at what kind of application people are having. How many of you have looked at the fridge in your house?

What is there in the fridge? What are the things people keep in the fridge? Fruits, food cooked food and raw food. Vegetables then ice- cream may be, then milk. Pardon? Food or maybe one-week food or two week food it depends. But more than that see, there are people there are people some people will keep all the dals and all of things in the fridge.

Somebody will keep all these things outside, somebody will keep inside, somebody will keep it in the freezer. So you need to have an idea of what the major things will be and what they will be

keeping. Accordingly, you will be able to identify the size needed for each cabin. So, this is actually a latent need. The customer would not tell you what should be the size of the freezer, what should be the size of the vegetable tray that is needed. These things you can actually look at by using the pattern of the customers.

So, how much space people normally use it for freezer. How much space normally keeps for vegetables. So again, you will get some latent needs from here. Approximately, percentage wise you can say thirty percent of the somebody will go for freezer and less space for vegetable or depending on the region it will be, so, looking at this pattern you will get latent need about the space distribution inside.

And then it malfunctions. So malfunctioning means it is not working. Simple, that is all. What will the customer do? Then you have to call the service center. So you need to have service facilities in that region. So that is one latent need coming more from the business perspective not from the design perspective but at least, you need to know what are the major failures that can happen and how to address these issues that become one latent need, the type of failures that you can anticipate.

And then the service, so there is a service involved. So you should be able to design in such a way that the service becomes easy. Not that you have one small failure in a product where you have to dismantle the whole product and then have to address it. You should be able to make a design in such a way that the service request can be easily addressed. That becomes one of the latent needs, easy to service or easy to repair. So easy to repair will be one requirement which is again a latent need. As a customer is not worried about easy or difficult, as long as it gets repaired, he will be fine, he will be happy.

But it is the designer's job to make the repair easy for the product. That is easy to repair. And that is coming as another latent need from the customer perspective or activity diagram. And the last one, at the end of this, dispose. With the lot of talk on the environment and eco-friendly systems. So, how you dispose of this product is something that a designer should be aware of,

from the beginning itself from the design's stage itself, he should be clear what kind of disposal options are there for the product.

What are the things that can be reused? What things can be disposed of without affecting the environment? What are the things which need to be carefully disposed of to avoid any particular environmental impact? So, that again becomes the latent need of the product. For example, in the case of a refrigerator, most of the time, the temperature may be in good condition and you can actually use it. Most of the trays in good condition, you will be able to use it for some other purpose. And the metallic parts which actually get rusted need to be properly disposed of.

So, the latent needs actually cover these aspects also by looking at what way the product can be disposed of. So these are the ways in which we can analyze the activity diagram and then identify all the latent needs of the products. So, the direct needs can be obtained using questionnaires or interviews. But the latent needs cannot be obtained from the customer directly. And therefore, we need to go through a different process and identify the latent needs. So one of the easy ways to do this is an activity diagram.

So you look at the activities happening in the product or the life cycle of the product and see if there is any specific instance where you can identify a particular need. Not necessary that every stage is a need. But you should be able to identify if there is any specific stage where there is a latent need involved. And that you should be able to identify. So that is the basic requirement in a that is a basic way, how you identify the latent needs of the product. So if you have to do the activity diagram for a product, that has already come here.

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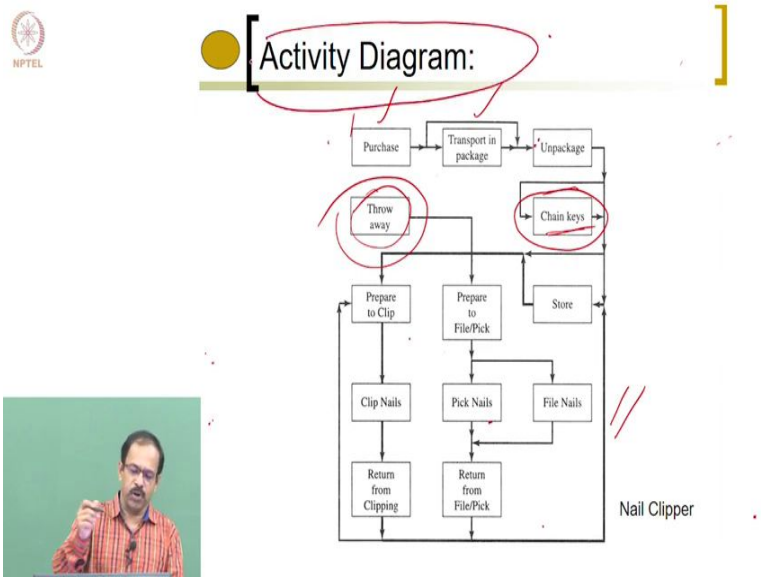

So this activity diagram shows the activities involved in identifying the latent needs of the nail clipper, a very simple product but you can see, still there are a lot of stages involved which you need to look at and then identify what are the latent needs involved. So if you look at the purchase, then transport, for sometimes you carry it so there is no separate transport involved. Sometimes you put everything into a large basket of purchases you have then you put it in the basket and then transports.

So if there is a requirement of transport then you can look at the packaging otherwise you do not need to worry. And then many times people put some keys into the nail clipper. There will be some chain and then you like to add something to the nail clipper. So that is something which you say people are interested in. So probably, you have some facility to put some keys into the product and then you store or then use.

So prepare to clip, and prepare to file or pick the nail. And clip nails return from clipping and clip nails and return. And then file nails and go back to the store. And then you continue like this and then sometime you will find that it is not worth keeping it, so you throw it away. So when you throw away what are the issues involved?

What kind of needs are there when you have to throw it, can you throw it directly into the normal, your waste basket or you have to separate the waste basket because nowadays you have different kinds of waste basket plastic, metal, food, etc. So what are the conditions under which this can be thrown away. So this is the way you look at the activity diagram of any product, this is just an example.

I will be, so you need to, you should be able to know how to prepare the activity diagram and identify the latent needs of the product.

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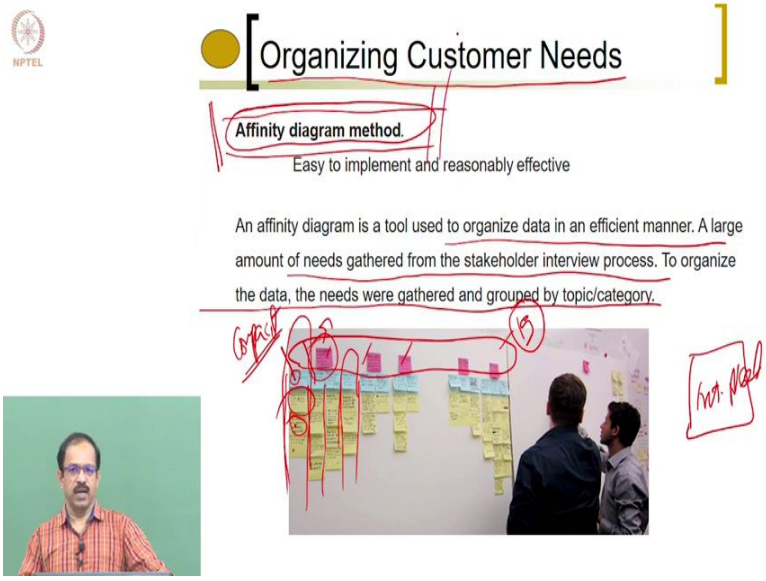


The next important question is, now you have hundred customers giving you hundred needs hundred customers giving you ten needs each or thousands needs. And then you have a lot of needs identified from your customer use pattern or activity diagram. How do you compile them and then identify the actual needs? Thousands of customers will be giving different needs and how to identify all these needs in a proper way is basically known as organizing the customer needs. And we use something called an affinity diagram method to do this.

To categorize the customer needs and then sort out the customer needs, we use the method called affinity diagram method. Have you heard of this affinity? All of you know what affinity is?

English word. Affinity towards something, affinity towards particular things. Now, it is a tool used to organize data in an efficient manner.

A large amount of needs gathered from the stakeholder process to organize the data, the needs were gathered and grouped by topic or category. So that is basically the affinity diagram. So what we do, all the needs you identify. You write it in a posted pad. Posted pad is something like a yellow or different color, you can see here, these are known as the posted pads.

So for each customer, you write the need, identify, interpreted need , into this yellow posted pad. And then you start using a white board, you start sticking these onto the board. You take the first customer you put these needs and you take the second customer and then you will see that second customer is also telling the same thing what the first customer said. If there is the same or there is affinity between these two needs, you put it below this one. So this for the first customer, this may be for the second customer.

Even if it is new, you put it in a different place. So like this you try to categorize the needs using the posted pads. So write everything in a posted pad. And then take one by one and then try to categorize them into different categories. So for example, somebody will say it should be compact, somebody say the size should be small, somebody should be able to carry it in my pocket. So, all those things talk about the same thing.

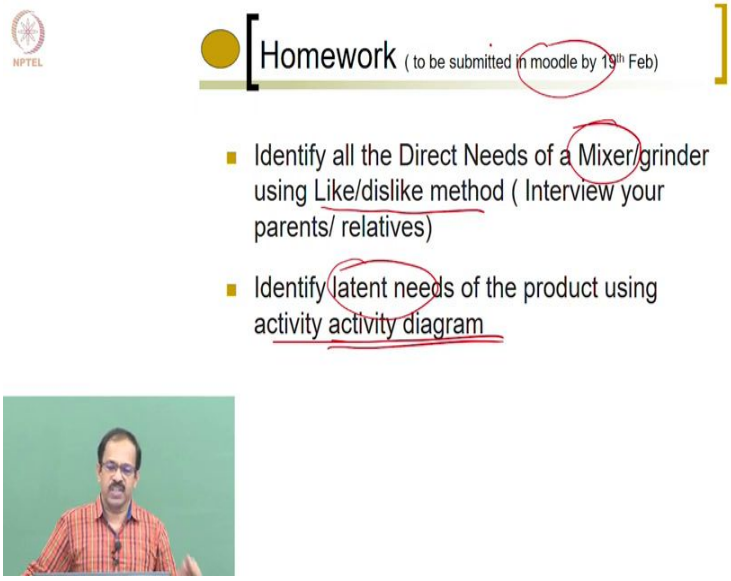
So if you see something similar to that, similar such needs are there. You put everything into a single row, single column. Similarly, this use will be in a different column. So each column actually represents a particular need. And then what need that you can identify can be put into another color posted pad. So all these three basically tell, it should be compact. So you are actually putting customer needs of different customers and identify what are the actual needs these customers are talking about.

So you will be getting this as a particular need and then you categorize this one. Basically, from the cost side or view, low cost, size, or shape or whatever it is that you identify at the top of this. And then give the importance, then this becomes the actual needs of the products.

Though you have thousands of needs identified, finally you will be able to categorize them and then say that there are only 15 needs which need to be addressed in the product. That is the way, how you start categorizing the needs, and then bringing the needs into some specific needs and that can be provided in the product. Customer needs that can be provided in the product. So this is basically known as the affinity diagram method.

We will discuss this in the next class, how do you actually do an affinity diagram method for getting the product but before we close, I will give you a homework.

(Refer Slide Time: 42:01)



So what you need to do is, so you have a form Like/Dislike method form. So I have given you the Like/Dislike method form and again there is a form. So you need to interview your parents, your mother, your sister, father whoever you feel is the right person to give you the answer. Ask them what they like about this particular product.

You mix all of you, everyone will be having a mixer at their home. And they will be using it every day. You ask your parents what they like about this product, what they dislike and what applications they have. Somebody will be using it for grinding; somebody will be using it for grinding dry grinding or for some other purpose. Somebody will be using it to make dough for dosa, idli.

So what are the applications and what are the likes and dislikes and what suggestions do they have? So please collect this and then do the activity diagram for this product to identify the latent needs also. And what you need to do, you do not need to give me the hard copy, you scan the hard copy both sides and submit them in the module because I want to keep the hard copy with you. We will be doing exercises later with the same hard copy.

So scan the answer sheet on both sides and submit it in the module by the 19th that is Wednesday. Sufficient time you have just to ask questions. Anyway, you call your home every day. Just ask these questions and submit this and keep the hard copy with you, I will ask this later for you to submit.