Usability Engineering
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Module - 10
Lecture - 32
Conceptualization and Prototyping II

Welcome to module 10, lecture number 32. Now until the last module we have focused on the various design process sections, we talk about the various phases of the user center design approach. Specifically, in the last module we did talk about various ideation techniques and it is important for us to follow those techniques. Because.

Now we are in a phase where we have defined our requirements from the user study and we have also conducted a market study we know the strengths and weaknesses of our competitors, we know where to position our product.

And now with all these findings we are in a position to define our brief. Now having said that once we are clear about our brief we now start working towards the goal of coming up with ideas. See at the initial stage of ideation as you have already seen the focus was more on quantities rather than qualities. So, if you have seen the techniques that we talked about perspective change, building analogies, a scamper, the six thinking hats; all these approaches focused on ways through which you can come up with multiple ideas.

Now, necessarily not these are ideas that are detailed in nature, but rather we can say varied ideas that may help us in addressing the requirements of our user. In this second module which is the second part of conceptualization and prototyping we will now dig deeper into designing the micro interactions of the concepts that we have developed.

Now, at this phase we are in a situation where we have a sufficiently a good number of ideas we know that ok these many ideas we have generated. Now what we intend to do is that we intend to take one idea each idea at a time and we would like to go for detailed some level of detailed ideation where the micro interaction part will be now conceptualized.

Now, in order to have a closer look at the micro interactions aspect of your ideas, it is important that we understand what micro interactions are and how do we proceed for

designing and development of this kind of ideas for farther taking them into prototyping phase. So, let us begin with our discussion in this session on microinteractions.

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So, this module we will be definitely focused on the aspect of design for microinteractions followed by how do you, you know select one of the ideas and go ahead with detailed prototyping wireframes. We will cover all these topics in short in this section.

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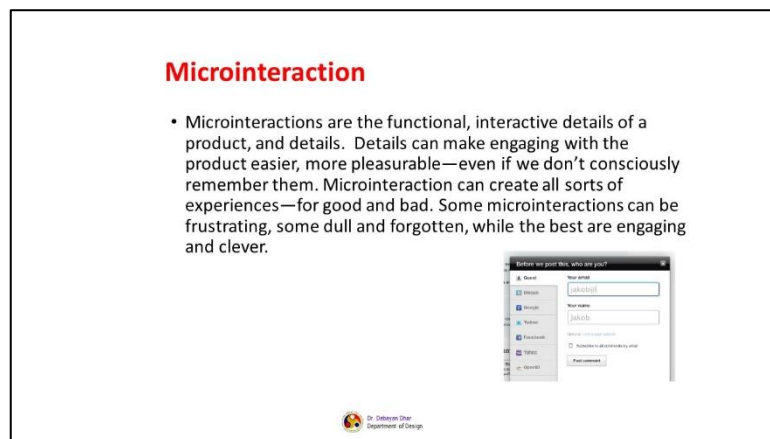
Now, what are micro interactions? See, we often in interaction design talk about interaction being a communication of a dialogue between the humans and the systems or the computing systems. Now when we talk about micro interaction, we mean to say that these are the functional and the interactive details of a product and the details of how it is going to reciprocate to the queries that we have.

Now, details can make engaging with the product easier more pleasurable even if we do not consciously remember them. So, micro interaction can create all sorts of experience it can be good, it can be bad. Now some micro interactions can be frustrating, some are dull and forgotten while the best are engaging and are very clever.

I would like to explain a scenario here. Remember how you interact with Facebook or you interact with any email client say Google, Gmail or Outlook mail consider the way you log into the system each step that you take right from typing your username, then going for the password, clicking on the login part or if you want to register it for the first time.

The entire details that you have to follow fill up and then register and then you enter; there is a dashboard you know where functions are being kept which functions are being kept where. You know if you move your mouse what are the going what are the interactive effects that you are going to observe.

You know also know where if you click certain things what will happen, what which window will pop up and what it will ask you if you want to compose a mail for example, where do you click, what kind of window comes up all these minute details. If you see essentially helps us in completing our goal.

Now if you talk about the email client our goal is to send a email message an asynchronous message that we want to send to someone to the recipient. Now though the overall goal is sending an email, but if you break it down into smaller elements.

If you remember the KLM model that we discussed about if you try to identify its operators if you try to define the path from where does the cursor moves to where, where it gets clicked what opens up, what do you see what are the visual affordances; that means, what element tells you what to do; all these are essential for you to complete your task and activity through the interface that have been presented to you.

At any stage if the communication between what is being asked for from the system side or what you want to provide if there is a breakdown or if there is miscommunication the entire goal of sending an email or a message would break down. So, these smaller communications this smaller level of interactions that we have or rather the activities smaller activities that we undertake to ensure that we complete our overall goal, which is

sending email in this case is essential to complete our overall objective of using the product.

These smaller activities that we are focusing on are called as the microinteractions that shape the experience that we gather while using a product. Now what you see in this image in this slide is a small dialogue box where you can see that there are sections of you can put down your email ID, you can put your name, you can there is a radio button or a subscription button where you can click and subscribe to all the comments and you see it actually tells you the section that for which you are filling up the details right.

And the terminologies that are being used. This is the dialogue the system is trying to have with you. This is a communication that the system wants to have with you and all these communications are part of the overall objective of what you intend to do with the system. In this section we will discuss about all these minute and minor interactions that shape our interaction experience while we intend to complete a goal with the software product.

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Now, micro interactions are good for what? They are good for accomplishing a single task, they are good for connecting devices together, they are good for interacting with a single piece of data, they are good for controlling an ongoing process, they are good for adjusting a setting you, they are good for viewing or creating a small piece of content, they are good for turning a feature or a function on and off.

Now, what do you see here the specific activities that have been listed here if you see accomplishing a single task, connecting a device, interacting with a single piece of data controlling an ongoing process adjusting a setting, viewing or creating a small piece of

content turning a feature. These are all part these are all part of the overall goal that the system intends to complete based on the user's requirement right.

So, there is a requirement you have developed a product or you have conceptualized a product that the product would help in addressing these requirements and these are the smaller activities, that are being engineered or embedded into that entire activity while you reach the goal to ensure that the users' goals are achieved and which are this accomplishing a single task a single activity, connecting devices.

So, there might be an activity where you are supposed to connect multiple devices. For example, you are connecting your mobile with your smart TV you are connecting your mobile software or a software in your mobile with your AC right; interacting with a single piece of data. Now there are many data that are being generated when a system function.

For example; a particular software or a particular piece of file is being downloaded what do you do with that data? The system has to recognize that and prompt with an information that ok this download has happened. Now what do you want to do? Do you want to save it or do you want to open it? These are all examples of micro interactions.

Controlling an ongoing process many functions many processes that take much longer time you want to control them you want to do you want to tell the system what to be performed and what not to be performed. These are the ways through which you do it. Adjusting a setting; consider manipulating your settings in your smart phone.

Viewing or creating a small piece of content; same, that is a trigger the user wants to view a particular image comment on a particular user story or a storyline right turning a feature or a function on and off consider IOT devices where you are turning on and off a particular function of the light or the fan or the AC.

These are all the aspects of micro interaction that we have been discussing about. And micro interactions ensure that the overall goal is achieved based on the sub goals or the sub activities you are performing. And you consider designing for micro interactions because it allows you to fulfill these activities that we have discussed just now.
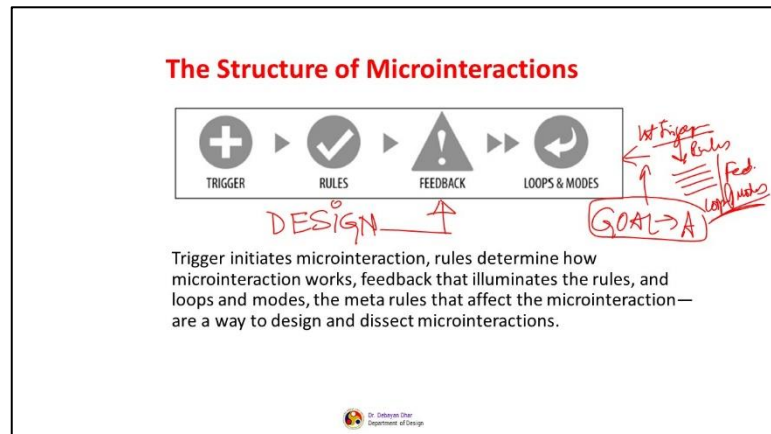
So, how do you design for these micro interactions? So, the question is how do you design for micro interaction. The answer is this. If you know or realize the structure of a micro interaction you would be able to design for a structure for a micro interaction. And what is the structure of micro interactions? The structure of micro interactions is what do you see in this slide. There is a trigger, there are a set of rules then there is a feedback and there are loops and modes.

These are the four critical phases of the structure of micro interactions. So, whenever you design for macro interaction, you must consider these critical phases or characteristics of micro interactions. What do we mean by trigger? A trigger initiates micro interaction. It is the first phase when a micro interaction is initiated by the user. Once a trigger is initiated rules are there that determines how the micro interactions will work.

See, whenever there is a trigger the system has to respond and this response need to be defined using a set of instructions using a set of rules and that is what we know by rules when we say that after trigger the rules are being followed. So, whenever there is a micro interaction that is initiated there are a set of rules that determine how the micro interaction is going to work.

After rules comes feedback that illuminates the rules. It makes the rules more obvious, it tells you the boundary of the activity that is being performed. So, there is a response that has been given from the systems side in order for the user to comprehend the actual state of the system and then comes the loops and the modes. These loops and modes are the meta-rules that affect the micro interaction.

These are a way to design and dissect micro interactions. So, whenever you are in a state where you have sufficiently generated a lot of ideas. Take up one idea and now start breaking it down in terms of smaller activities. So, that you can ensure how the overall goal is achieved if a particular idea comes like this that ok. This is the goal and this is what I want to achieve. Now, break it down into this structure so, ok.

What would be first trigger? Then what are the rules I am going to have ok followed by the feedback and the loops and modes. This is how you are going to detail out the micro interactions of your idea.

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Let us start discussing one by one. The first one is trigger. Now what is a trigger? The name itself is very clear that what do you mean by trigger. See trigger is user initiated meaning that the user has to do something right. So, for example, you can take in this case flip a switch take up a see when you enter into a particular room you are feeling hot what you do is you immediately switch on the fan. If you look at it from the micro interaction perspective you press the switch that is the trigger right.

If you want to login or if you want to enter into an email application, what do you do? You first login. Now if it is a mobile application you do not need to log in also you just touch the icon the application opens up and you can you are at your dashboard. So, that is a trigger. The first stage where your system understands what you want it to do, what you want it to perform.

Now, micro interactions begin with an understanding of user need. See, first that is the reason why we started defining the user requirements. What the users want to accomplish?

So, we know the overall goal where he wants to go. Now we are designing for the specific smaller activities. So, that we can ensure that he will reaches that goal.

When they want to do it? At what time? At what situations they intend to use the trigger and how often ok recurrence frequency. Here we are talking about frequency of use. This determines the affordances accessibility and persistence of the trigger. So, these are very very important aspects of micro interaction that the first to the trigger affordances.

You see something affordances means what? It tells you it communicates how to use that one. When you see at a door you see the door handle the door handle shouts at you and tells you that grab me here and push me and that is how you operate this door. Affordances are these visual cues that tells you about the function they do you comprehend right. It is a communication of information from a visual element that allows you to understand the function that it executes.

Accessibility; whether you can use it ok and the persistence of the trigger to what extent the trigger remains in operation, how many times we are talking about frequency, how many time he is going to activate this trigger and you know continue using this the this activity.

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But you must also understand that triggers need not be user initiated. So, here from being user initiated we are gradually now thinking about triggers which need not be user initiated. Increasingly what we see that triggers are system initiated. Now we are entering into the domain of intelligent applications. When the device or application itself dictates that

certain conditions have been met. See certain conditions have been met and begins a micro interaction these are highly intelligent systems.

They know that when certain conditions of are met these are the actions on activities a response I have to trigger.

Now the triggering condition could be anything from detecting that a new email has arrived to the time of the day to the price of a particular stock to the location of the user in the world. I remember some time back I was using an application that allowed me to use my location as a trigger to communicate with my other devices that if I am in this perimeter of my house please switch on this product, that product, that product, this product, these are system-initiated triggers.

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So, what we understand is that triggers can be in two ways; one triggers can be manual that mean manual triggers usually spring from a user want or need. So, we need to understand the users requirement and then there are system triggers that are those that engage when certain conditions are met without any conscious intervention by the user.

So, the overall goal is to make sure that the user it is being provided with whatever he or she requires the smaller triggers that are required to ensure that activities conducted smoothly can be system initiated as well right. So, in a micro interaction we must remember that when we consider about manual trigger we are talking about user generated data we are talking about trigger that would be supported by the response by a input mechanism from the user input how the user provides that data.

And when we are talking about system triggers we are talking about a situation where the system is governed by set of rules and whenever those conditions are being met there is a trigger.

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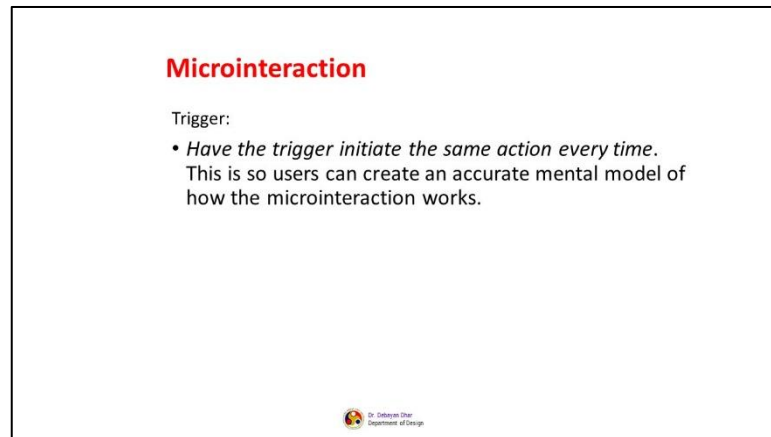
Have the trigger initiate the same action every time. This is one of the very important fundamental classic way of ensuring that you design trigger in a way that every time the trigger is initiated the same action takes place. This is so users can create an accurate mental model of how the micro interaction works.

See understand this you are trying to design a system. And you are trying to go as close as to the mental model of your user. Essentially the product is the conceptual model of the software designer or the designer UX designer.

Now if every time there is a new trigger there is a trigger and every time something new gets activated because of the trigger, the user will not be able to relate with that situation, the user will not be able to create a mental model that ok if I press this or if I type here or if I look at here or if I use this as a gesture this kind of activities will be performed.

No your user will not be able to do that in order to ensure that good mental models are formed you must ensure that every time a trigger a particular trigger; I am talking about one particular trigger if its initiated the same action gets triggered every time. It initiates the same action every time there is no discrepancy or deviation in the nature of the action that is being performed. This is one of the very important truths for designing the triggers.

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Second one; bring the data forward; that means, what see the trigger itself can reflect the data contained inside the micro interaction. So, if I am pressing something or if I am touching something it responds to that query. So, ask yourself what can I show about the internal state of the micro interaction before it is even engaged or while a process is ongoing.

Now, supposed to ask this question because you are designing that part. What are the most valuable pieces of information? I can show this requires knowing what most people will use the micro interaction for, but you should know that key piece of information before you even begin a simple example let us take an example of a stock market application.

Perhaps it can be indicated using color or arrow the current state of the marketer or the stock portfolio, which could prompt the user to launch micro InterAction. Now the trigger becomes a piece of ambient information available at a glance that might lead to using the trigger. So, what you understand here is the roll of one of the major things that we would study in heuristic evaluation which understanding the state of the system.

Whenever there is a particular activity or a stimulus there a trigger is being activated the user must understand the state of the system it is very important for example, the example of the stock market that I have given from here using color codes people understand what is happening with the data in real time probably. And they can take an informed decision where to invest when not to invest whether to invest or not.

So, this kind of meaningful presentation of information is very important to ensure that the trigger is being taken forward is being used, is being assessed, is being comprehended and

then subsequent activities are performed. And for this to happen you must ask yourself this question what can I show about the internal state; this is a very very crucial question that you should ask which what can I show about the internal state of the micro interaction before it is even engaged or while a process is going on.

So, whatever it may be if you want to you know login to a system, if you want to look at the data visualization particular in piece of information, if you want to switch on certain things; what you want your user to realize? You want him to understand about what he is going to do and what is the state that he is performing; that is what we are referring to as the internal state of micro interaction.

So, therefore, this principle is important bring that data forward. Whatever the execution is happening whatever the state is being performed allow your user to comprehend that state understand the state that that is what we mean by bring the data forward.

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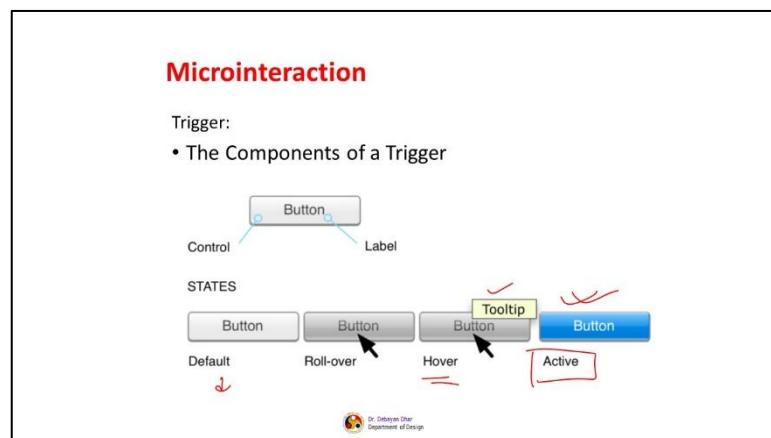
Now, let us understand the components of the trigger. So, this is just an example of the components you can see a button here. The label is very important the control boundary where you see whenever you move your cursor this kind of states are being activated the default state is where you can see here.

The button like this right and when you have a roll over you can see here when you hover here you can see a option like tooltip is being responded to and when it is active you can see like this. So, this gives an ample information to the user about the state of the system about the state of the trigger that we are talking about that information is being brought out regarding state of the button.

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Microinteraction

Trigger:

- The Components of a Trigger
- For a single action (e.g., fast-forward), a button or a simple gesture is a good choice.
- For an action with two states (e.g., on or off), a toggle switch makes sense. Alternatively, a toggle button could be used, although it is often hard to tell at a glance what state the button is in—or even that it might have another state.

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Now, the components of trigger can be for example, for a single action like fast forward a button or a simple gesture is a good choice. Now these are just examples that I am quoting, for an action with two states for example, on and off. You have in switch two states a toggle switch makes sense, you know toggle switch is? Alternatively a toggle button could be used although it is often hard to tell at a glance, what state the button is in or even that it might have another state. We can use the toggle state for two states.

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Microinteraction
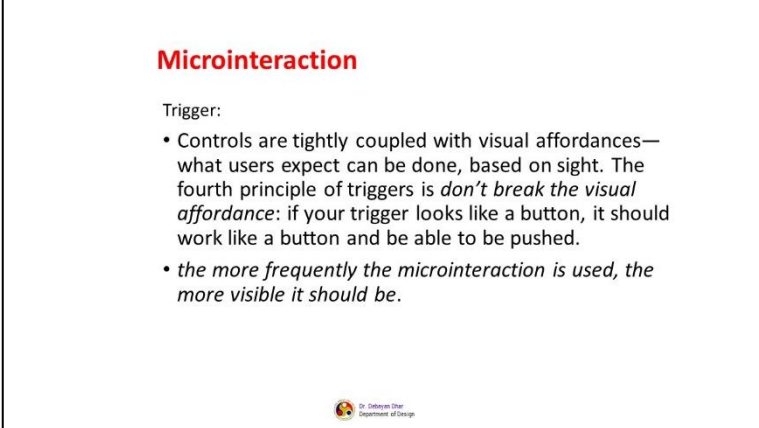
Trigger:

- The Components of a Trigger
- For an action with several defined states, a dial is a good choice. Aside from having detents, dials can have a push/pull toggle state as well. Alternatively, a set of buttons could be used, one for each choice.
- For an action along a continuum (e.g., adjusting volume) with a defined range, a slide or dial (particularly a jog dial, which can spin quickly) are the best choices.
- Some manual triggers are made up of multiple controls or elements such as form fields (radio buttons, checkboxes, text-entry fields, etc.).

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For an action with several defined states a dial is a good choice. So, aside from having detents dials can have also a push and pull toggle state as well. So, alternatively a set of buttons could be used each one for each choice then for an action along a continuum means like you know adjusting volume with a defined range the range is defined a slide or a dial are the best choices.

Some manual triggers are made up of multiple controls elements such as radio buttons checkboxes subscriptions that we have seen just now text twenty frills so, on and so forth.

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Microinteraction

Trigger:
- Controls are tightly coupled with visual affordances—what users expect can be done, based on sight. The fourth principle of triggers is *don't break the visual affordance*: if your trigger looks like a button, it should work like a button and be able to be pushed.
- *the more frequently the microinteraction is used, the more visible it should be*.

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There are some controls that are tightly coupled with visual affordances what users can expect, expect can be done based on what they see the visual cues right. The fourth principle I mean the principles that we have been talking about in terms of designing the triggers is do not break the visual affordance.

That means, the visual clue or the visual cue that the elements communicate is important to understand by the user about the state of the trigger or the situation. If your trigger looks like a button it should work like a button and be able to be pushed these are visual cues.

So, if you see the first principles that we talked about I can go backward is that it can have two triggers it can be a manual and the system triggers. Secondly, a trigger needs to initiate the same action every time and then we talked about the bringing the data forward. So, that each time a trigger is being used it provides an information about the internal state of the micro InterAction and therefore, the fourth one which is important it says that the visual cue must be there.

So, that the users can expect what needs to be done or can be done based on the side visual real right more frequently the macro interaction is used the more visible it should be this is the fifth one. You must understand or calculate the frequency of use of your micro interaction. And the more frequently your macro interaction is used the more visible it should be that is a rule.

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Now, these are all related to manual triggers that we have been discussing about. In case of system trigger rules these questions the questions that you say in this slide should answer should be able you should be able to answer the following questions. Like how frequently should this trigger initiate? What data about the user is already known? How could that be used to make this trigger more effective more pleasurable or more customized?

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Is there any indicator the trigger has initiated? Is there a visible change of state while the particular activity is being performed? After it is happened, when it is about to happen? So, the temporal constraint the time related questions need to be answered. What happens when there is a system error? For example, with a no network connection or no data or even similar data, but at the time differentiation is happening you know stop trying or try again these are the questions.

If the latter what is the delay until trying again. So, now, we are see we are now with these questions we are now talking about detailed activities; activities that are essentially being need to be detailed out to ensure that the goal is reached for the goal to be reached. And the goal is the major activity that we are being referring to that is the goal of your, that is the goal that the goal with which the idea is being presented to the user.

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All these are important part in defining your trigger. After trigger the next part is designing for rules. Now at the heart of every micro interaction just as at the sight of at the heart of centre of every game, there are set of rules that govern how the micro interaction can be used. What you are trying to create with rules is a simplified non-technical model of how the micro interaction operates.

Now, perhaps the most important part of the rules is the goal. See we have been talking about the goal. So, before designing the rules you need to determine in the simplest, clearest terms what the goal of the micro interaction is.

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So, the rules determine how the micro interaction responds to the trigger which is being activated. What control very very important questions what control the user has if any at all over a micro interaction which is in process that has being activated. The sequence in which actions take place and the time they are off and what data is being used and from where.

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These are some of the rules that you need to define. So, that the boundary conditions of the rules being made, so that a trigger can be initiated and it can work according to this set of rules are clearly defined. The configuration and parameters of any algorithms. For example, so, while the rules in their entirety can be thought of algorithmically often certain parts of micro interaction are driven by algorithms we would see a structure here.

What feedback is delivered and when? The rules could indicate which steps should get feedback and which operate behind the scenes.

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What mode the micro interaction is in a mode is kind of fork in that rules that when possible should be avoided. But sometimes it is necessary I can give an example like in many weather applications entering the cities you want to know the weather for is a separate entry mode from the default mode of viewing the weather. So, that is a concept of the fork.

Now, if the micro interaction the repeats whether the macro introduction repeats or not that is an essential question you need to ask. And if it repeats what is its frequency of repetition how often does it repeat. So, is the macro interaction a onetime activity or does it in loop it gets occurred again and again based on some criteria based on some conditions if met you know.

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So, what happens when the micro interaction ends? Does the micro interaction switch to another micro interaction? Does it vanish? Or does it never end? So, these are some of the very very crucial questions that you might ask to make your ideation more explicit. Keeping in view that the visual cues are very important for you for your user to comprehend the state of the system.

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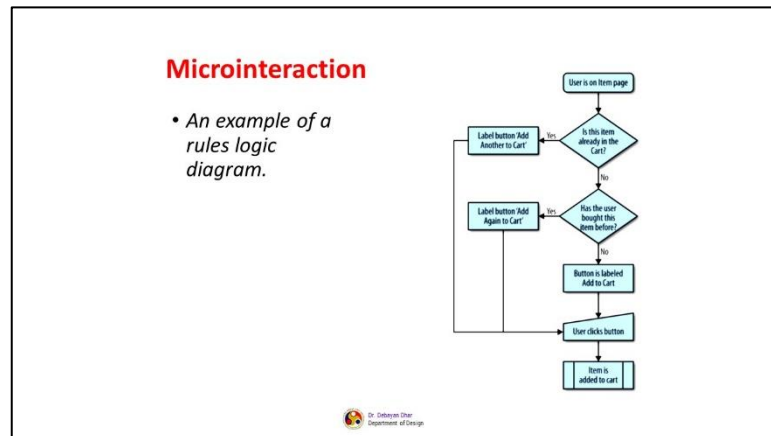
I will show you an examples of a rules logic diagram what you see here in the diagram is a structure where you know the user is on item page, there is a decision box where is this item already in the cart if its yes then label button add another to cart if there is no item then has the user bought this item before if it is yes then again label button add again to the cart see the rules. If it is no then the button is labelled add to cart then all these things come to the position where the user clicks the button and finally, the item is added to the cart you know.

This is the structure of the rules example of rules of the logic diagram. This ensures that the micro interaction is defined using a set of logic that operates based on the choices that the user initiates. We will continue discussion on this micro interaction part. This is about rules. In the subsequent lecture we will talk about the next part of the micro interaction and we will also look into the aspect of how we identify a particular concept and take it forward for prototyping.