Usability Engineering
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Module - 03
Lecture - 08
User Centered Design Process

Welcome to lecture 8 of module 3, in this lecture module we will discuss about some salient points and important characteristics of the User Centered Design Process. Before we discuss about these salient features, let us go back and see some very significant factors or commentaries that Professor Don Norman has stated in the books that we have been discussing in the last lectures.

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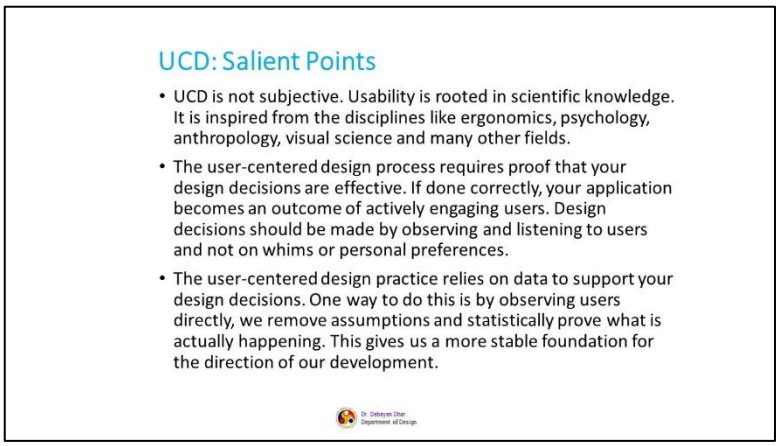

Now, in 1988 Don Norman offers four basic suggestions on how a design should be. And he says that make it easy to determine what actions are possible at any moment. Make things visible, including the conceptual model of the system, the alternative actions, and the results of the actions. Make it easy to evaluate the current state of the system.

And follow natural mappings between intentions and the required actions; between actions and the resulting effect and between the information that is visible and interpretation of the system state. Now, what we understand from the suggestions provided by Professor Don Norman is he is essentially trying to ensure that the actual users of your software system can understand can comprehend the state of the system.

It is very important for your user to assess the state the of your of his activity or her activity and then decide the kind of activities, the kind of call to action features he or she might use. And for this it is important that you make the design of your interface easy. So, that the user can assess the state and can determine what are the possible actions he can execute at that moment.

It is all also important that for him to understand the possible actions, the conceptual model of the systems which we will be discussing later in the subsequent lectures should match the mental model of the user and that means, the alternative actions, the alternative the results of the actions should be visible to what the interface is providing.

All these parameters, all these information are very very important from the perspective of your actual users. So, that he or she can evaluate the current state of the system in order to decide or determine the actions that he would like to execute.

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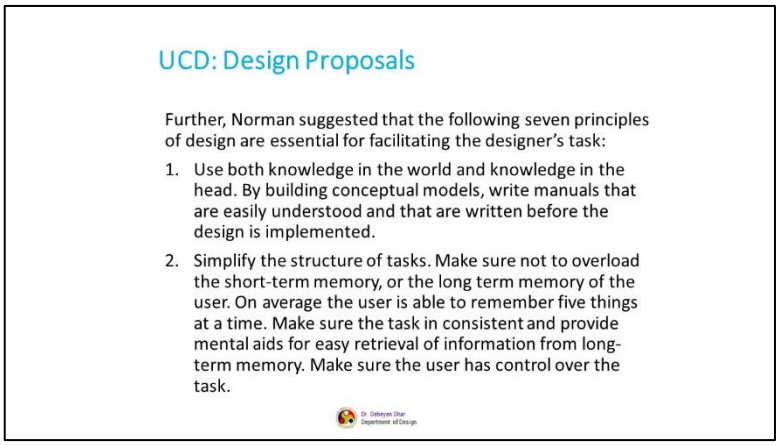

Further, Norman suggested that the following seven principles of design are essential for facilitating the designer's task and as designers or software developers it is important for us to understand and follow these principles. What are these? These are we must use both knowledge of the world and the knowledge in the head; that means, by building the conceptual models and writing manuals that are easily understood and that are written before the design is implemented.

Simplify the structure of tasks; we in we need to make sure not to overload the short-term memory or the long-term memory of the user. On average the user is able to remember five things at a time. Make sure that the task is consistent and provide mental aids for easy

retrieval of information from long-term memory. And make sure that the user has control over the task. Whenever your user starts interacting with your design with the product, he has or she has certain preconceptions in the mind.

These preconceptions generally get formed from past experience, culture also plays an important role in shaping those experience and the visual structure that he can visualize or he conceptualize is what we refer to as the conceptual model. Now, by building conceptual models writing manuals that are easily understood and even before the design phase I mean the design phase is implemented, if we have these conceptual models clearly defined.

So, conceptual models are the model that the designer interprets from by understanding the world around the designer when we say understanding the world it means understanding the designers, representative users understanding their mental models. And also, the mental model that the designer himself has or visualizes about the product; this too has to match.

He then goes beyond and then he starts conceptualizing a product, this information that he draws from the world in form of user study and he himself has contributes to the formation of the conceptual model of the product and this should be clearly defined even before the actual design is delivered.

We should have a clear written down manuals tasks how the task needs to be completed. So, that even before the product is developed, the product is designed we know how it has been, how our information and the information that we have drilled down from the user study has been used to create this conceptual model. And this conceptual model plays an important role in the early adoption of products by your users.

Because, if the conceptual model of the product does not match with the mental model of the user immediate rejection of the product will happen. Then he talks about simplifying the structure of tasks; he says Professor Norman says that we must not overload the short-term memory or the long-term memory the short-term memory is the space where immediate information is stored for immediate retrieval.

So, you know for conducting, processing certain amount of information for making sense of the surroundings and taking decision you must need some sort of information that is stored in a space that can be readily available to you that space in our brains, we call it as

a short-term memory. Now, that is a very layman way of understanding short short-term memory.

Now, it is important for us that if too many information is asked for the user to process or if he requires to process to accomplish a task; as a designer we are overloading him with the request to access information from his short-term memory, if he does not get the information and if the information is not stored in his short-term memory, he might go and then even search the same in the long-term memory.

Now, the question here that is important for us to ask is that do we have that leverage to make our user overload by forcing him to go into this kind of search and retrieval activities we do not; because time is precious for our user and he needs to complete his task as quickly as possible with highest degrees of satisfaction. Any effort whether it is physical, whether it is mental, if the effort in executing a task increases his load will increase if the mental effort increases the cognitive load will increase.

And therefore, it would become a tedious process for your representative users to complete the task and therefore, it is important that a task is consistent and it must provide mental aids for easy retrieval of information and from long-term memory as well as from short-term memory.

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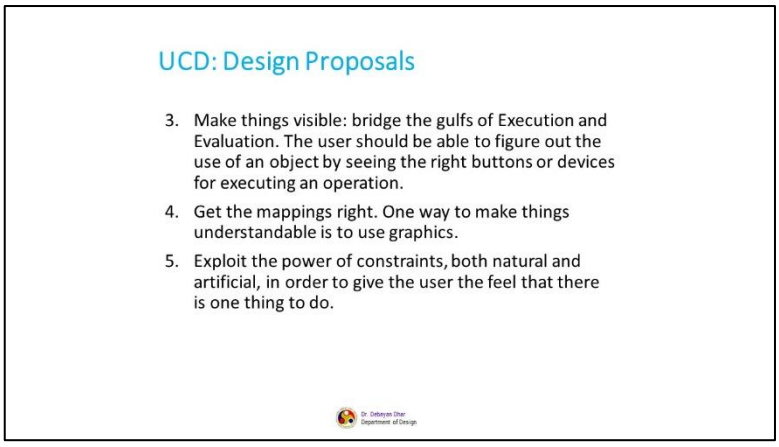

The user finally, the user must have a sense of control over the task that he is performing. The 3rd point Professor Don Norman says is make things visible bridge the gulfs of execution and evaluation. The user should be able to figure out the use of an object by seeing the right buttons or devices for executing an operation.

The 4th point is get the mappings right. One way to make things understandable is to use graphics is to communicate the information visually. 5th exploit the power of constraints both natural and artificial, in order to give the user the feel that there is one thing to do. See it is important for here for all of us to understand and realize that when we talk about the conceptual model of the product and the mental model of the user what is being understood.

Or communicated here is that the product has the conceptual model of what the designer has built; while the user has their own mental model and it is this that ensures whether the product will be adopted that you have designed as a designer or it would be rejected. If there is a match between the conceptual model and the mental model of the user of your actual representative users, it would be an instant hit the adoption would be high.

But if the user has to try if the learning curve for the user increases and he has to learn your system, your software, your product to adopt it. It will have a negative effect on your user he will not like this extent of effort, this amount of effort that he has to put in order to understand or figure out how the entire task has been planned and therefore, what Professor Norman says here is that make things visible.

So, that the gulf of execution, this is what we term as the gulf of execution the difference or the amount of effort that your user makes from the mental model he has to reach to the conceptual model of the product that is the gulf of execution. We will discuss about that in subsequent lecture as well, but these can be bridged if you make things visible and recognizable.

If your interface has features, has cues that communicate what the user your representative user is looking for; that means, he should be able to figure out he should be able to recognize what he is looking for and your interface feature should be designed accordingly; putting right buttons and call to action features in devices for executing an operation. Therefore, the importance of fusidic is heavily dependent on defining the requirements of a user.

Because, we do not want a situation where there is a mismatch between the conceptual model of the product and the mental model of the user.

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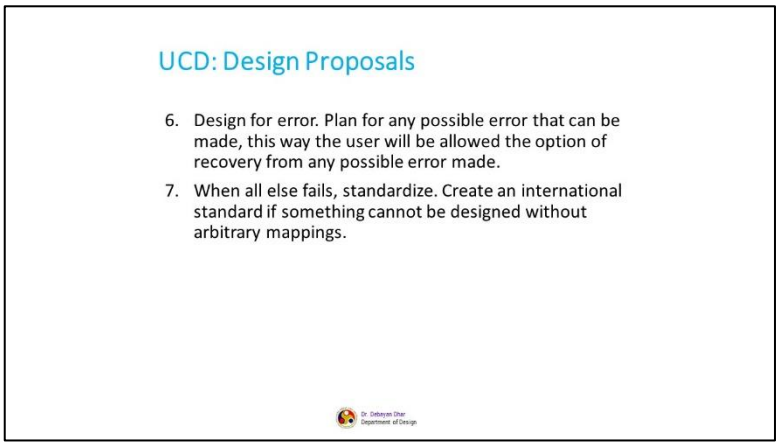

The 6th point design for error; plan for any possible error that can be made this way the user will be allowed the option of recovery from any possible error made and this last point is when all else fails standardize, create an international standard, if something cannot be designed without arbitrary mappings.

Designing a completely flawless product is almost close to impossible. I am not saying that you cannot design yes, you can design a excellent product that is highly efficient, that is highly effective and that provides a higher level of satisfaction. But, even then what happens in majority of the time the your user will encounter sub errors, that is almost inevitable any system that have been designed faces this kind of situations where during operations, during task completions and tasks being performed errors happened.

And these errors can be very very notorious. This can lead to a complete distraction in the context of use. It can create havoc based on the context of use and the state of error is highly highly delusional. It is delusional because, the actual user fails to recognize his state and then in situations where palpitations happen in situations that are highly critical, he might commit another error which might make the situation more worse think about a situation a product like aircraft control, think about the situation of a healthcare device.

Now, in these situations in these critical situations errors are highly highly dangerous; because it can lead to even serious consequences even of between consequences like life and death. Therefore, it is important for the design team to consider these situations while designing a product. How do we ensure that even if your user encounters error he or she can recover from it?

Can we design assistance, can we design support for our users? So, that these states even if happens, if a state of error even if even it gets occurred things can be recovered. You can recover from the state by following assistance from your product and this requires matriculate planning by the design team to ensure that these use cases, these contexts of use are defined early and suitable reinforcements to provide support to the users in these cases where errors occur are delivered.

This will not only ensure that your user gets calm takes informed decision, but this will also improve trust and satisfaction from your users regarding your product. They will have a sense of faith that even if there is an error, even if they encounter an issue, there is this product, this design that will support them to recover from it.

And if nothing works Professor Norman is saying that follow standardized guidelines, see the rules and regulations established under World Wide Web consortium. These rules can act as a deterrence for having a product that will provide against negative experience. If these proposals are followed, you will be able to ensure that you have a product that caters to the requirements of your actual users and addresses their needs in the most proficient effective and satisfied way.

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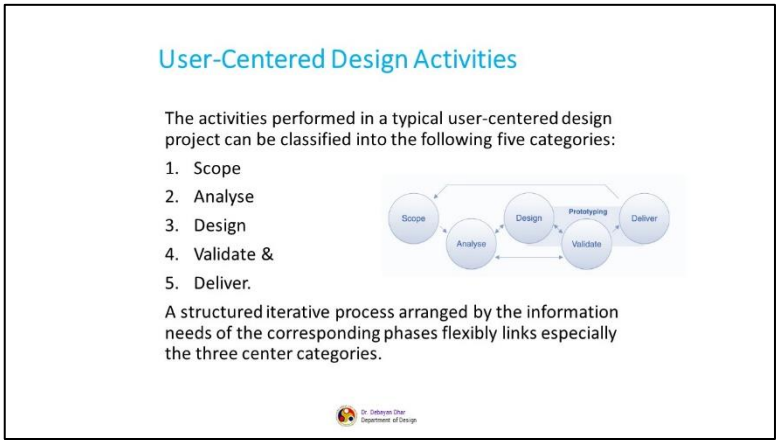

User-Centered design activities are generally structured as a five layer activity. You can see in this slide that the activities performed are scope, analyse, design, validate and deliver. These are the five categories under which the activities that are being planned or generally undertaken by design, designers in user-center design process are classified.

We will discuss about this in subsequent models' modules, but as of now it is important for us to understand that by scope it is meant that clear articulation of the requirements are defined. So, that the positioning of the product is clear. Now, this also reflects that apart from focusing on the user requirements business driven goals should also be defined and both should be used as a reference to define the scope of the product.

The second part focuses on the state where analysis happens; where you focus on understanding the competitors, where you focus even on redefining the requirements more specifically from the perspective of your representative users. Once the state of analysis is carried out, you then have something which call as a design which we call as a design brief. The design brief is a statement that directs the design team towards the conceptual stage and it provides with the direction for the innovation to happen.

At the stage of design, the focus is on to come up with as many ideas as possible and this is done keeping in mind the design brief, the goal that we want to address and ensure that it is fulfilled. The design stage focuses on very initial level of ideations and also to detailed level of ideations; it also includes process where we once we have a bucket of ideas, we then start analyzing individual ideas and focusing on the one that we would like to quickly prototype and go for user testing.

The 4th stage is validation where we focus on getting the users our representative users on board, we run, quick usability testing user testing with them; in order to understand whether the conceptual model of the product matches with the mental model of our representative users, any critic at this stage from the users are taken constructively.

So, that the issues that can be diagnosed or that comes up can be addressed before the product is released in the market and the final stage is the stage that we call deliver where any software product is initially released as a beta product and until you know further issues are identified and it is released in the market.

Now, this is a highly structured iterative process. The way I have discussed it might not sound very iterative, but at each stage the designer or the design team has the liberty to fall back to their users, to their representative users, to their stakeholders, in order to ensure that the decisions that they are taking are representative in nature; that means, the decisions reflects the mental model or matches the mental model of the user.

So, it is a structured iterative process that is arranged by the formation of needs of the corresponding phases, flexibly links especially the three categories that is analyses design and validate.

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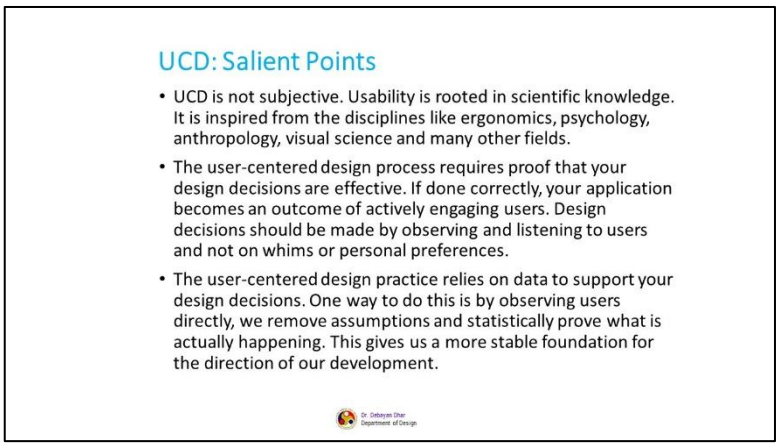

Now, before we go and start we start discussing about each of this phase in detail some of the important and salient points that we all must remember is now you the user-center design process is not subjective ok. And by that we mean that the techniques that we will study in these course or in this field of knowledge is rooted and rooted in the disciplines like ergonomics, psychology, anthropology, visual science and many other fields.

And it is not subjective because the user-centered design process requires proof that your design decisions are effective, this is a very very important point that all of us should remember. And if it is done correctly your application becomes an outcome of actively engaging users. Design decisions should be made by observing and listening to users and not on whims or personal preferences. I am making this statement because many a time in the industry, in that student projects we see that design decisions are being taken from the perspective of the designer the design team thinks it is suitable for them.

Therefore, they take it takes the decision and go on with the design activities. We will discuss here that many a time this might lead to grave situations, if the design team or the designer is sufficiently accustomed with the user segment; he has a spend a lot amount of time in understanding the users in other projects or working with them, knowing them in depth it might work if it takes a call.

But, then for new and young designers who are into this profession of design thinking they must ensure that they spend a huge amount of time trying to understand their users, their representative users, the people whom would like who would use their product. The user-center design practice relies on data to support your design decisions.

And that is why we call that it is not just subjective, just for your understanding it has to have a case where any decision that you take has to get influenced from the data that you have collected. And one way to do this is by observing users directly. We observe, so that we remove assumptions and statistically prove what is actually happening. This provides a more stable foundation for the direction of the product development.

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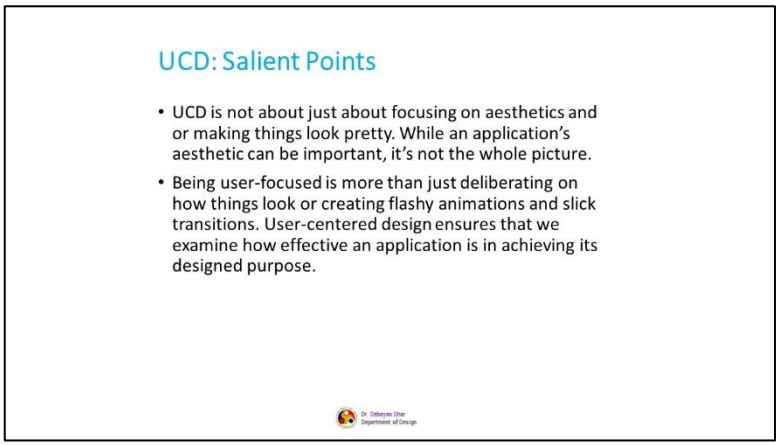

User-centered design is not just about focusing on aesthetics or making things look pretty this is another misconception that many communities or professionals hold. While in application's aesthetics or aesthetic appearance is important because the first level of engagement happens there, but then it is not the whole picture.

Being user focused is more than just deliberating on how things look or creating you know flashy animations and slick transitions. User-centered design ensures that we examine how effective an application is in achieving its designed purpose.

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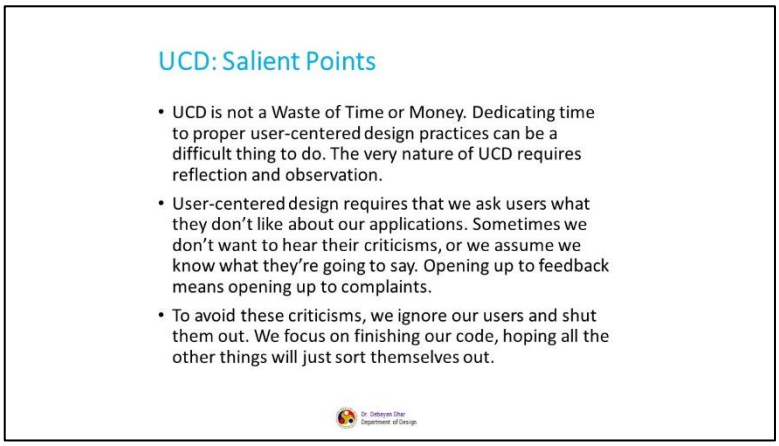

Many a time it is also said that UCD or following a user center design process is a complete waste of time or money; absolutely wrong UCD or following user center design process is not a waste of time or money dedicating time to proper user center design practices can be difficult thing to do.

It is highly difficult because you require an extensive amount of deliberations to ensure that your users' requirements are defined correctly and for that you require you might require traveling, conducting user studies, a lot of time is required a lot of finance monetary implications is associated with conducting this kind of studies.

And obviously, since you would be doing all these activities the time period required to conduct this is a constraint and therefore, many time people say that or organizations think that UCD is a waste of time. So, it is not; the very nature of user center design requires reflection and observation. It is the process of reflecting on the observations that you as a designer is making. User-centered design requires that we ask users what they do not like about our applications.

Sometimes we do not want to hear their criticisms or we assume we know what they are going to say. Opening up to feedback means opening up to complaints. To avoid these criticisms, we ignore our users and shut them out. We focus on finishing our code, hoping all the other things will just sort themselves out, but it does not happen.

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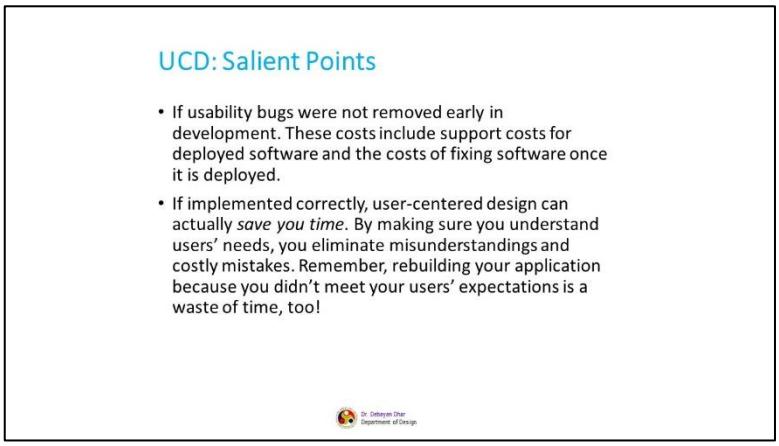

If usability bugs were not removed early, early in the development process the cost that would include like support costs for deploying for the deployed software and the costs of fixing software once it is deployed would be huge. So, in order to ensure that all these issues does not arise we must ensure that UCD is followed.

If implemented correctly, user-centered design can actually save time by removing these bugs early. And it will actually save time and save a lot of money by making sure that you understand user's needs, you eliminate you eliminate misunderstandings and costly mistakes. And remember building your application and always remember that designing the application or even redesigning a one is a costly affair.

And you are redesigning probably because it did not work the way you wanted it to work. It did not meet the user's expectations, it did not fulfill the user's requirements and therefore, this kind of situations when happen is also a waste of time and resources. So, you have to choose as a design, as a design team, as a designer yourself or an as an organization whether you spend time in saving resources to ensure that these bugs a software product gets.

Or gets to address what your user wants or you would or you would end up in a situation, where you would see that you release a product which has a lot of bugs does not focuses on what user requirements are and therefore, user adoption did not happen your user's did do not like using it.

Then you come back and again have to rework on it. So, therefore, user center design or following the user-center design process is not a waste of time it. In fact, ensures that you

save time you save this cost and have a product that gets successful when you release in the market.

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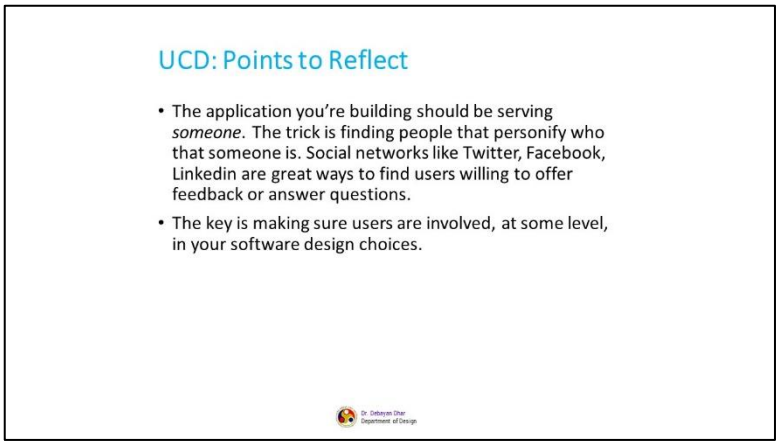

The product, the application that you are designing that you are building should be serving someone; who is that someone, the trick is finding people that personify who that someone is. I have seen many a time people currently nowadays use LinkedIn, Facebook, Twitter to find their users.

And they go and ask them to fill up a quick survey or even ask for their time to conduct an interview session and these are great ways to find users who are willing to offer feedback or answer your questions. The key is making sure users are involved at some level in your software design choices that is what matters and that is what you should focus at.

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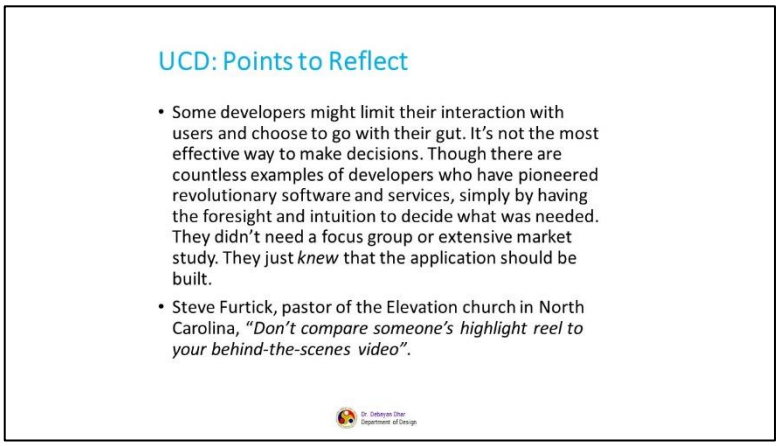

Some developers might limit their interaction with users and choose to go with their gut, I have seen that many times it happens in the organization. Now, it is not the most effective way to make decisions though you know there are countless examples of developers who have pioneered revolutionary software and services simply by having the foresight and intuition to decide what was needed.

They even did not need a focus group or extensive market study. They just knew that the application should be built; for this kind of situations the statement by Steve Furtick a pastor of the Elevation church in North Carolina is important and he says that "do not compare someone's highlight reel to your behind-the-scenes video".

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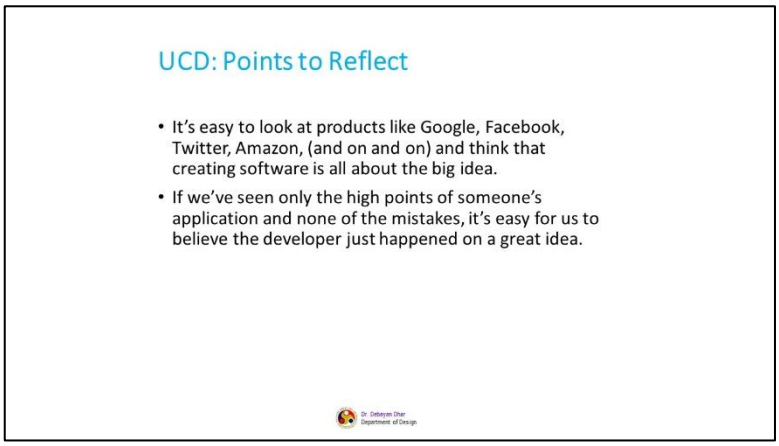

What we are trying to refer here is that it is easy to look at products like Google, Facebook, Twitter, Amazon, and many other products and think that creating software is all about the big idea is all about the gut feeling, no. We have seen only the high points of someone's application and none of the mistakes. It is easy for us to believe the developer just happened to have a great idea, but it is not; it is not true, let me give you an example here.

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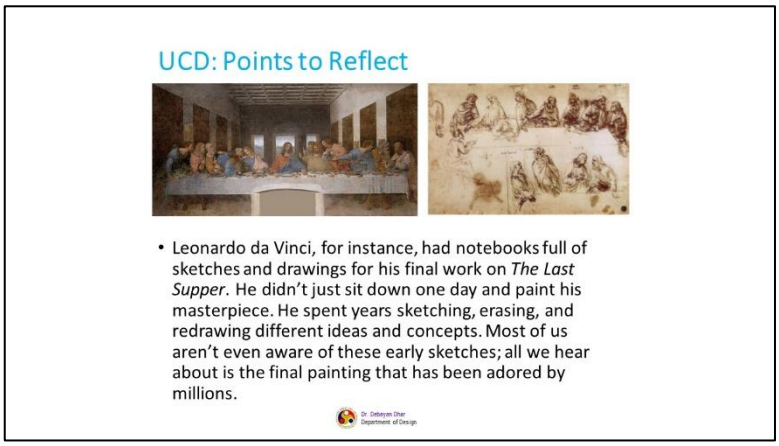

Do you know these paintings? This is the famous painting of Leonardo da Vinci Last Supper. If you see this painting you will realize, how great how great Master Leonardo da Vinci was.

But we never realize the notebooks which was full of sketches and drawings for his final work the Last Supper, he did not just sit down one day and paint his masterpiece what you see in the right-hand side of the image was the one of the sketches that he has made while coming up to the main drawing The Last Supper. He spent years sketching, erasing, and redrawing different ideas and concepts. And most of us are not even aware of these early sketches; all we hear about is the final painting that has been adored by millions.

The same is true what the pastor was saying he was trying to mean the same thing what we see as a product like Google, Facebook, Instagram are products that has enormous number of man hours people getting involved, failing people have failed they took in they introspected on their failures, they reflected what that mean and they re-worked out again to ensure a good product; as a user we do not see this kind this reflective practices we do not see the detailed activities that these people have performed in order to ensure a product like this.

So, therefore, let us not assume that these guys had one big idea and they just made it their product. No, they also had a long long journey where they have failed, they have learned the difference between the process that many software developers or many people like us we tread is that we many a time believe on our guts which is a wrong practice.

We should instead focus on a user-center design process; we should focus on getting our requirements correct in order to ensure that the product that we are designing meets the expectations and requirements of our actual users.

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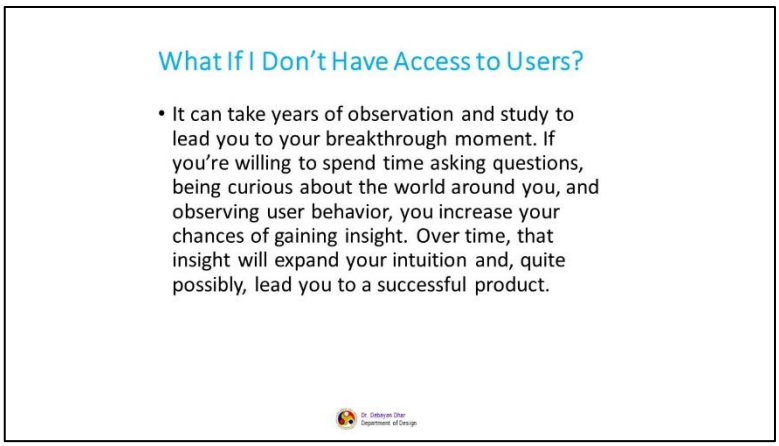

So, it can take years of observation and study to lead you to your breakthrough moment. If you are willing to spend time asking questions, being curious about the world around you and observing user behavior, you increase your chances of gaining insight. Insight that accurately reflect the requirements of your users over time that insight will expand your intuition and quite possibly, lead you to a successful product.

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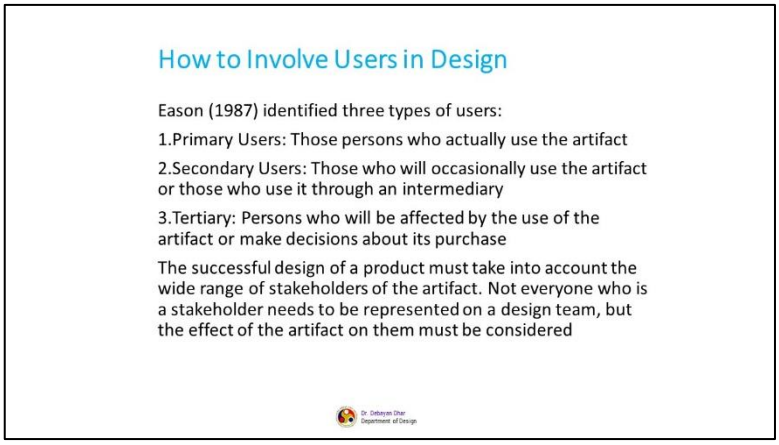

So, how to get users involved in design. Eason in 1987 identified three types of users: 1st primary users, 2nd secondary users and 3rd tertiary users. Primary users are those persons who actually use their artifact. Secondary users are those who will occasionally use the

artifact or those who use it through an intermediary. And the tertiary users are those persons who will be affected by the use of the artifact or make decisions about its purchase.

While we conduct user study, we analyze the stakeholders it is important for us to realize and understand who our primary users are, who are our secondary users and who are our tertiary users. Successful design of a product must consider; the wide range of stakeholders of the artifact, not everyone who is a stakeholder needs to be represented on a design team. But, the effect of the artifact on them must be considered.

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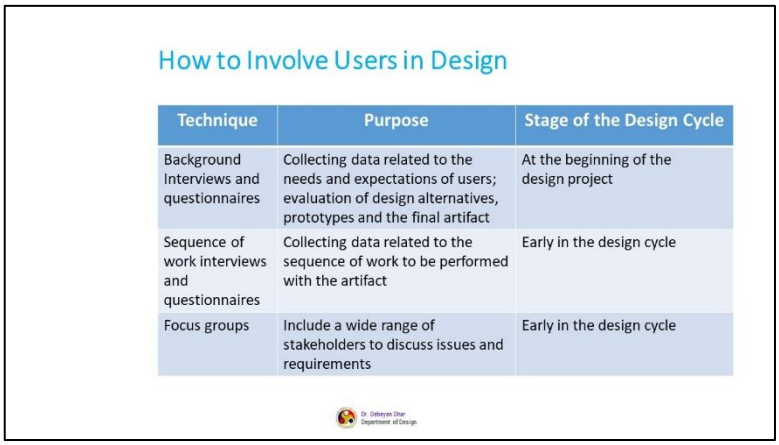

The techniques that we are going to subsequently learn, in this course and the subsequent modules are in short listed in the table; we are going to learn about background interviews and questionnaires. The purpose for these techniques is collecting data related to the needs and expectation of users, evaluation of design alternatives, prototypes and the final artifact. These are the purpose for which this technique is used and this these are used at the beginning of the design project.

Sequence of work interviews and questionnaires are used for collecting data related to the sequence of work to be performed with the artifact and we use this technique at the early phase in the design cycle. Similarly, focus groups it includes a wide range of stakeholders to discuss issues and requirements and it is also used in the early stage of the design cycle.

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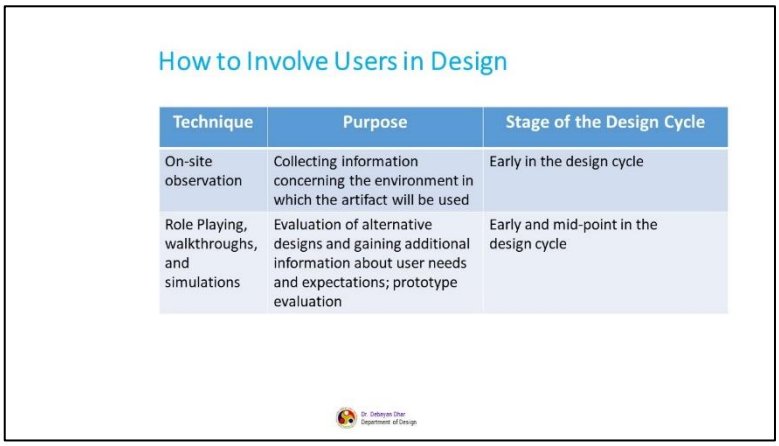

On-site observation it is used for collecting information, concerning the environment in which the artifact will be used. So, it is also used in the early stage in the design cycle; role playing, walkthroughs and simulations these are used for evaluation of alternative designs and gaining additional information about user needs and expectations and for prototype evaluation. These are primarily used during the early and the midpoint of the design cycle. And finally, we have the usability testing and the interviews and questionnaires.

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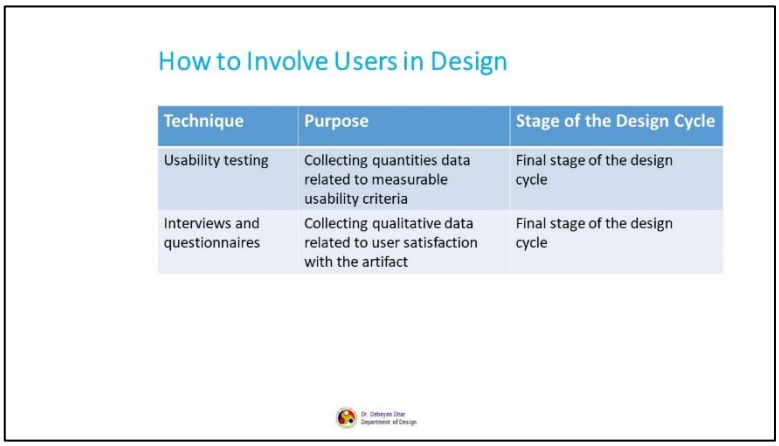

Now, usability testing is used for collecting quantities of data related to measurable usability criteria. So, we learn about this criterion, in detail in subsequent lectures ideally. We use it during the final stage of the design cycle and interviews and questionnaires are used. Similarly, like usability testing they help us in gathering the measures for those particular constructs they are used to collect qualitative data related to user satisfaction with the artifact.

And these are simultaneously used at the final stage of the design cycle, the way we use it like usability testing in the subsequent lectures. We will discuss more about the individual stages of the user-center design process and we learn about these techniques in detail.