Usability Engineering
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Module - 01
Lecture - 01
Introduction to Usability

Hello everyone, welcome to the first lecture and the first module of the course Usability Engineering. I am Dr. Debayan Dhar. I am a faculty member at the Department of Design, IIT, Guwahati.

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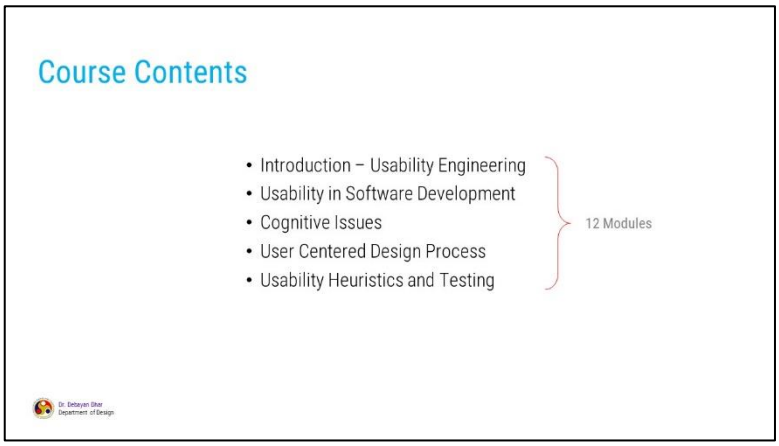

In this course, we will specifically talk about these important topics and these topics will be covered across 12 modules. First, we will discuss about the Introduction to Usability Engineering. We will talk about its definition, its historical foundations and what are the different interpretations to the different terminologies that exists in the industry, also in the academia. That would constitute the introduction part of this course.

Followed by this, we will then talk about usability in software development. So, we would extensively talk about the process of software development, wherein, usability issues are considered, how software development life cycle gets influenced because of the concerns of human factors.

This would create a benchmark for understanding the software engineering life cycle and that would allow us to interpret how do human factor issues really influence the mental

model or the acceptance of any software products by the customers. We will also briefly talk about the cognitive aspects and the issues, pertaining to the human factors perspective.

We will then focus in detail about the user centered design process; the process that designers prefer, the process that designers take and the way, they move towards conceptualizing a product given requirements are defined. And finally, we will talk about usability heuristics and testing. Now, these five important topics will be covered across 12 modules in this course. Let us begin with a brief introduction to the course usability engineering.

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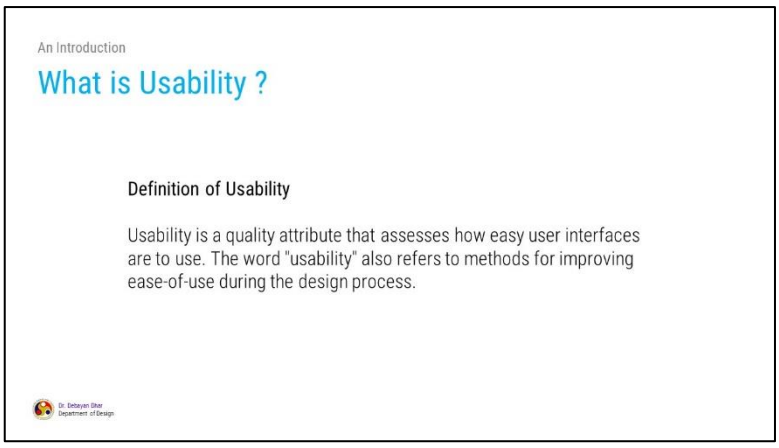

At the onset, let us first understand how usability as a concept is defined across the industry as well as by designers working in this field. Now, usability is a quality attribute. You know any product whether it is a tangible product or a software product which is considered as an intangible product has some features, some attributes, some characteristics which are qualitative in nature and that is what we consider as important factor that governs the acceptance and continuance of the usage of that product.

So, usability is considered a quality attribute that you know assesses how easy user interfaces are to use. Here important aspect is we are focusing on user interfaces. As designers, we are considered, we are concerned about the interface between humans and the machines and we have this interference through which we communicate with the machine. So, therefore, how well we can use this interface in order to achieve our goal is what governs the concerns of usability right.

So, the word “usability” also refers to methods for improving ease-of-use during the design process. So, it is a qualitative parameter and it concerns improving ease of use, how well and satisfactorily, obviously, we can complete the activities to reach our goal.

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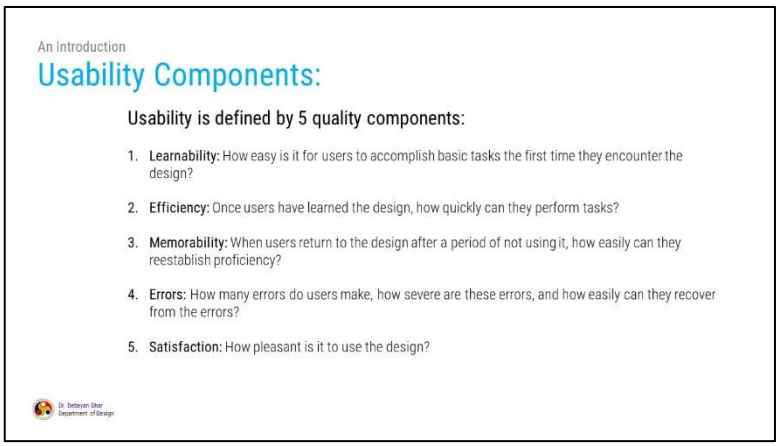

Now primarily, usability is defined by 5 quality components right and these components are learnability, efficiency, memorability, errors and satisfaction. Learnability as it itself implies it is how easy for users to accomplish basic task the first time they encountered the design. Here, design means design of the interface.

Now, if you realize this meaning, you will understand that here learnability is associated with first time users, with users who are novice to that product or have first time encountered the product and has started an interaction with the machine through an interface.

So, how quickly and easily; instead of quickly parameter is how it is easily the person can learn the features, the components of the interface and can easily accomplish the task to achieve his goal. That is how we define learnability. Now, coming down to the second one efficiency, now once users have learned it you know means the design, how quickly can they perform tasks?

See, generally, what happens once any user, when he or she encounters a product for the first time, you know, there is a learning curve. He requires some amount of time; he or she requires some amount of time in order to learn the interface so that he can accomplish the task. But over practice by accessing or communicating or using the interface over a period

of time, this user who was initially a first-time user, a novice user gradually transforms to an expert user.

So, it is because of the recency of use that he is getting transformed from being a novice to an expert. And as he transforms between from you know being novice to expert, he wants to perform the task quickly. He does not want to take the long routes or the long work process in order to accomplish the task right. He wants to do it faster.

In this, situation, how much time he takes to complete the task, how quickly he can access the features in completing the task is of paramount concern to this kind of users and that is what we call as efficiency. Third, memorability. See when users return to the design after a period of not using it, if there is a break between the usage and between two usages, how easily can the users reestablish proficiency.

It might happen for example, you know take the example of any word processor. You have you are already accustomed in using any word processor ok. You are very fluent in typing and using the functions of the word processor. Now, over a period of time, you stop its usage or you do not require it; but then, after a period of time, if you come back again you know, how easily can you establish the way you used to work you know and that is to the level of what we call as proficiency.

Can you remember, can you recognize instead of some amount of remembrance is required; but more than remembrance can you recognize the important features, the mental model of the product quickly so that you can become proficient that is associated with what memorability we talk about. Fourth, errors. A very very important and significant aspect of usability is the measurement of errors or the concept of errors.

Now, how many errors do users make and how severe are these errors, how easily can they recover from the errors? These are some of the very very significant issues that are of concerned to usability experts, designers, user experience designers and every time, the design a system, they conceptualize the mental model of the system, these concerned of whether the users would be able to complete the task without committing an error or to what extent existing errors can be reduced is of paramount concern.

And finally, it is all about satisfaction right. How pleasant is it to use the design? Are you enjoying the experience of using your product, the interface? You it might happen that

while booking your tickets or using any online travel assisting platforms, you have seen that you prefer one over the other; Why? Because of all these factors; learnability, efficiency, memorability, errors and all this contributes to satisfaction right.

If your customers, if your actual users are satisfied, they becomes your you know users, who will come again and again and will they will use your system. So, they become your loyal customers and that is what all products, all software products you know eye to have.

They want to have customers who are loyal and therefore, they focus on how to ensure that customers or actual user satisfaction happens that they use their platform a lot instead of going and using their competitor's platform right. These are the key 5 components when we talk about usability; learnability, efficiency, memorability, errors and satisfaction.

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Apart from these 5 components, we also have these 2 components which is often talked about and these are of important concern for the design community and these components are effectiveness and engaging. Now, what do we mean by effectiveness and engaging?

If you have seen when we talk about any product, one of the paramount concern of any product we have is whether our customers or users can complete their goals or achieve their goals with a high degree of accuracy. So, in case of whether if you want to book a online ticket, it is very important if the interface that you are using, allowing you effortlessly to book a ticket you know without committing any errors right and you should be able to complete the task the most effective way.

That is what high degree of accuracy is there, that is what we are talking about, effectiveness. Now, much of this effectiveness of a product comes from the support provided to users when they work with the product. You know for example, there is a common example being talked about many many design faculties like take the example of your payment gateway or the interface, where you are trying to make payment and you chose to make a payment using your credit card.

So, what happens? While you type, while you type the credit card number, it tells you whether the number is valid or not right. You would see some kind of icon reappearing in the other end of the you know the entry field which says whether this card is of a particular organization or not.

And what happens? This reduces errors that might happen during the data entry part. You might wrongly type something in a hastily, you know what happens? That many a time, we have the card in front of us and we wrongly type it, it can happen. But then, the interface is providing you support. The moment you type something hastily and if there is an error it will give you a kind of queue, that you have committed an error and that allows the users to complete the task correctly, accurately.

So, accuracy is important here. We are talking about a situation, where if your users can get feedback so that they do not commit errors or number of errors are reduced, we are talking of a situation which has high degree of accuracy and you know that is what we are concerned that accuracy is related to effectiveness.

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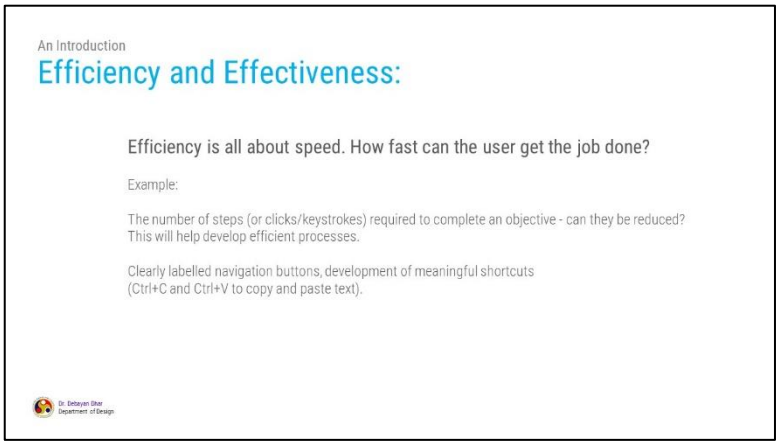

Now, whenever we talk about effectiveness, the concept of efficiency comes there. You know many a time, it happens that people get confused with what is the concept between the concepts of effectiveness and efficiency. Now, remember that efficiency is all about speed right. It has nothing to do with accuracy. While in effectiveness, we are concerned about accuracy of completion of the task ok. So, efficiencies concern how faster your user can complete the job.

For example, you know if you can see the slide, you would realize that we have an example here. The number of steps or clicks you know required to complete an objective, can they be reduced? You know this will help develop efficient processes. So, if you reduce the number of clicks or number of steps, it will help the user to complete his task in a faster way.

So, the time period that would be taken to complete the task would reduce. In a sense, it will increase the speed in completion in task completion right. Many a time, you have seen that while using software products like word processors, you use like control C and control V. But if you remember in your earlier days, when you first started your using word processor, you used to use it in the most traditional way. But as you migrated from being a novice to an expert, you started using the shortcuts.

These are also another way. So, providing shortcuts is also another way of you know increasing the efficiency of task completion that when a person is a novice, this person is going your user, who is a novice when he adopts the product for the first time, what he is going to do is that he is going to take the steps which are much longer in nature, long steps, detailed steps in task completion.

While an expert user does not take those kinds of detailed steps in task completion. He or she looks for shortcuts so that the task can be completed and the goal can be reached in a much shorter time thereby, increasing the efficiency of the task right.

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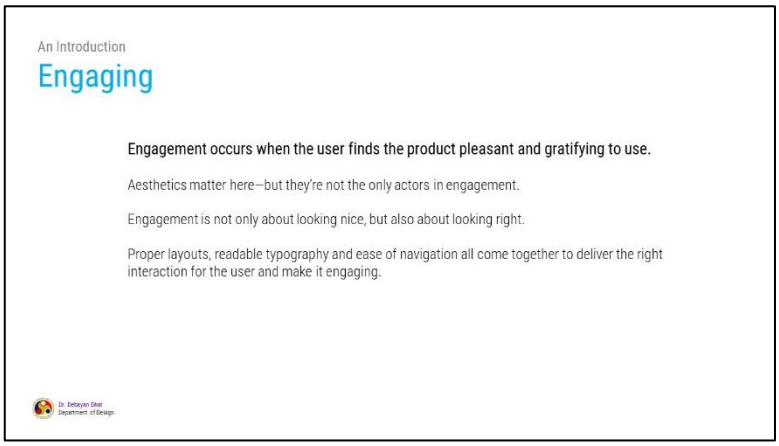

So, apart from effectiveness, the other parameter which is of greater concern in the design community is engaging. Now, engaging occurs when the user finds the product pleasant and gratifying to use. Now, what does that mean? It means that whenever you have an interface, whenever you have a product you first of all the first level of engagement or interaction happens at the visual realm right.

So, aesthetics here plays a major role. If your product looks good, if it is visually appealing, then engagement happens at the first level right. So, aesthetics matters here. Now, this is not the only important parameter for a product to be engaging. It is not about. So, engagement is not only about aesthetics, it is also about being perfect; proper layouts, readable typography, ease of navigation, the mental model obviously of the product, we will discuss about this later what do we mean by mental models.

All these things comes together to deliver the right interaction for the user and make it engaging.

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So, after you know these important components, what important aspects we need to understand is the concerns which is related to the concept of utility, usability and usefulness. Now, why we are discussing all these things? It; we are discussing all these important aspects of usability, because you need to understand your users, we need to understand how users make choices, take decisions, their way of thinking so that we can design based on what they require right.

So, in order to do that, we must know the concept of usability, utility and usefulness. So, until now, we have discussed about the concepts of usability. So, we are very much sure about what usability is and you can also refer to the slides, when I say that usability means how easy and pleasant your product is to achieve a goal. So, it concerns the ease of use and the satisfaction, the pleasantness of the interaction of the product while in use. But utility is something different. Utility is not usability.

Utility means whether your product provides the features that a user needs. That means whenever see for example, whenever you go to the market to buy a product, you have so many products in display. What do you do? The first and most important thing is you take a decision based on products.

You go for detailed specifications, you look at the features, you look at other aspects like aesthetics too and then, internally, you compare, you evaluate whether this product will help me in completing my task, whether the features that I am looking for or whether the goals or the task that I intend to complete, can this product help me in reaching my goals

or completing my tasks. So, these evaluations happen inside you internally or your customers.

So, there is a constant evaluation of whether the features or the product characteristics will allow a particular user, who is observing that product for buying it, will that product allow the user to complete his task. That evaluation happens constantly and this is when the user takes a decision whether the product will help him or would not. That is what we call as the concept of utility.

So, the concept of utility lies with the evaluation of whether the features given in the product will help the user in fulfilling his desired goals right and that is how he make sure that he would go for this product and not that right. So, what is the difference between these two, usability and utility? If you closely realize or understand, usability concerns an evaluation of how the product is while the product is being used right; while utility is a concept that relates even before the actual use happens.

So, you are, you mean your actual user is trying to gauge whether this product would be beneficial for him or her in completing the goals, in reaching the goals and tasks. At this stage, your user is not evaluating how easy the product is to use. He is just evaluating the features that are there. So, that is the essential difference between utility and usability.

Now, the most important aspect, when utility is fulfilled when initial evaluation is successful and the customer or your user decides that no this is my product, I think this is going to help me in reaching my goal, he takes a decision that I am going to buy this product and after buying this product, he likes it, he is satisfied; it is easy to use in his task completion, then he realizes that this product is useful right. That is how we define useful or usefulness. So, it is a component.

The any, the idea of usefulness is derived from the fact that the product has to be or has to have features that we concerned that we as we mean actual users considers our, considers utility features and whether the ease of use and while using the product, whether the user is satisfied or not; both these concerns are together considered as something that the actual users consider as useful product.

So, this idea is very important before we even start understanding usability because see our final destination as designers is to ensure that the products that we design should be

accepted in the market. And not only should it get accepted, but people should our actual users should continue using the product for a long period of time and therefore, from that perspective, it is important that our product should be utility products.

And then, it should be usable and when these two things are fulfilled, we have a product that is considered by our actual users as useful and it will continue be in use for a long period of time. Now, I have given an example here, if you see now, a lot many payment apps are coming and you know you can also design a new payment app, you can have new features in it, you can have probably features which are there in the Facebook, probably adding friends in the payment app and also even looking at the post of your friends.

Now, consider it is a payment app right. Now, if you allow your customers to add friends, it is ok you can add friends so that it can help in payment; but also to read their posts, will it be useful? Will this feature be a feature of utility? Because finally, this is the payment app right. So, while adding friends for you know having future payments might be a case of concern; but reading posts of friends in the payment app is not a feature that your actual user is looking for, while he while he is using your payment application.

So, this is just an example to let you know that you need to understand the requirements of your actual users specifically, you must realize what are the features that my actual users considers as utility features, which are the tasks they want to complete first. So, we are considering the concept of primary tasks. What are their secondary tasks? If these things are detailed out, then accurately, then what happens?

A product designed by you becomes utility product because it has all those primary features which are of concern to the actual users. And once you have designed, the task flows of how those tasks get completed by your actual users, while they use your product and if the tasks are planned in a way that its easy and usable and high degree of satisfaction can be provided from the way they have been planned to the actual users, you have a product that can be considered as useful.

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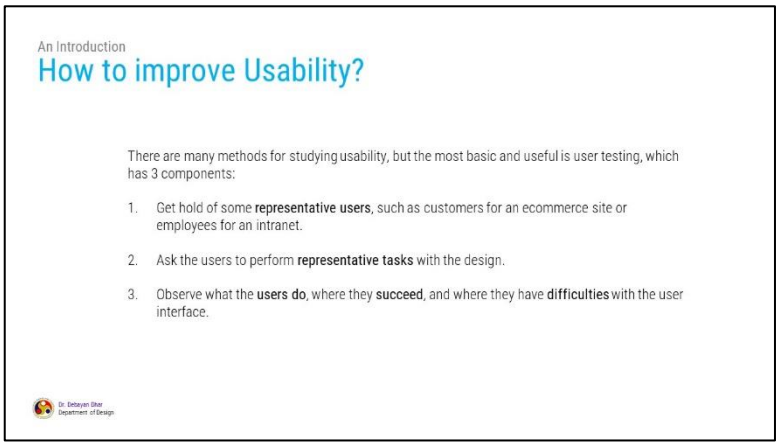

Now, so in this course, while we discuss all these topics in detail, we will also discuss how do we improve usability because that is what our goal is. We just do not want to understand the core concepts of usability, we want to understand how do we improve usability. So, there are many methods of studying usability and some of the basic and most useful, I have just listed here in this slide and you will see 3 components to it.

First, get hold of some representative users. See, understand that I have used the word representative right. This is important ok. Get hold of some representative users, customers for an ecommerce site or employees of an internet ok that is the first step. Second, ask the users to perform representative tasks. This is also important. I will come back to this discussion later. Third, observe what the users do, where they succeed, and where they have difficulties with the user interface.

If you see we are talking about observation, we are talking about what users do, where they succeed, where they have difficulties right; these are the keywords which are important concerns of the design team or the designers. Now, why did we talk about representative users? See many a time, what happens? Many design teams or designers considers that for conducting user study, we just takes random people, ask them few questions and then, we will get some data. This is a wrong practice.

We should not go and adopt this kind of practices because unless you are talking with the actual people, who are going to use your product or who are facing issues because see your concern is to identify the issues and design a product and if these issues does not come from the actual users, you will always land up in investing time and resources in designing

a product that will never actually fit to will never be a fit to the actual users. So, that is of paramount concern. So, representative users that mean actual users.

The second most important point is we must understand or study the representative tasks that means the task that are of concerned to our users, right. We are concerned here to identify the issues of our actual users and therefore, if you take or if you define a task as a designer on your own, you might face a problem here.

Because it might not be true that your users, actual users are also doing the task those tasks and doing in the way you think they are doing. So, instead of speculating from the designer studio or from our studios, we must go to our actual users. And learn from them how do they complete the representative tasks, the actual tasks and what should be our goal while we observe those tasks?

Our goal should be to observe what our users do, what they are doing, that is of paramount importance for us as designers and that is what we are going to learn in this course. Where do they succeed, under which circumstances, during which situations, they feel satisfied, they feel happy you know they can complete the task with a with ease right and the most important thing that we must identify is where they have difficulties right.

See as a designer, your objective is to identify issues that are of concern to your actual users and these issues, you will be able to observe if you go and observe your actual users, while they are doing actual tasks or the tasks that they do generally. And if you can identify those specific disruptions, those specific pain points, where your actual users are facing difficulty in completing the task, in reaching their goal, if you can identify those issues that is what you can consider as an opportunity area as a designer to conceive a design intervention right.

So, these are the 3 components of how we can study user; what do we need to study and at what sections, do we need to concentrate in order to extract the data.

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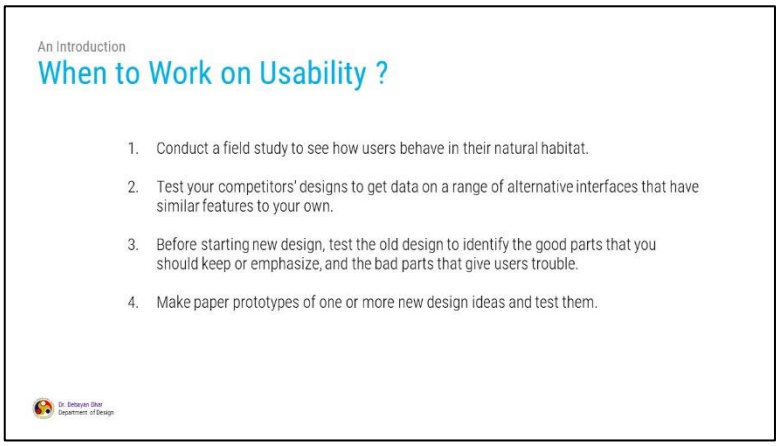

Now, when to work on usability? See, first of all, many a time, we teach about how to conduct field study. So, you would see how the objective is to see how our users behave in their natural habitat, we test the competitors. Now, in the sense, if you are doing a project where you essentially do not have a product to redesign, but you are trying to identify the way your actual users are working, their working conditions and what kind of issues they are facing.

You would go to those situations, you would study them and you would also realize that while you study them, you would be able to identify the actual products, the actual artifacts products or intangible products they are using in order to complete the tasks. Those becomes the competitors for you because you are trying to come up with the design intervention to address these issues and the kind of products that your customers are using now becomes your competitors.

So, identifying a competitors is also an art, is also a technique that is very important. If you wrongly identify a competitor and you remove a just competitor and then, what happens that your entire product fabric, the fabric of your innovation, design intervention falls flat because it might happen that your competitor might already have addressed those issues right.

So, analyzing our competitors provides us with data on a range of alternative interfaces that have similar features to the one that we are envisioning or we have and before we start new design, we must test the old design to identify the good parts that we should keep or

we should emphasize and the bad part that the users are of concern to the users and that are giving trouble to the users, we must remove them.

That is a very very important aspect. So, we must go back to our users, we must go to our users and study with our old design in order to identify these important things, these important aspects. Make paper prototypes of one or more new design ideas and test them.

We will see as we progress that the role of quick paper prototyping and getting on to the users with these paper prototypes, getting feedback from them and working out on those re-improving those based on the feedbacks that we receive.

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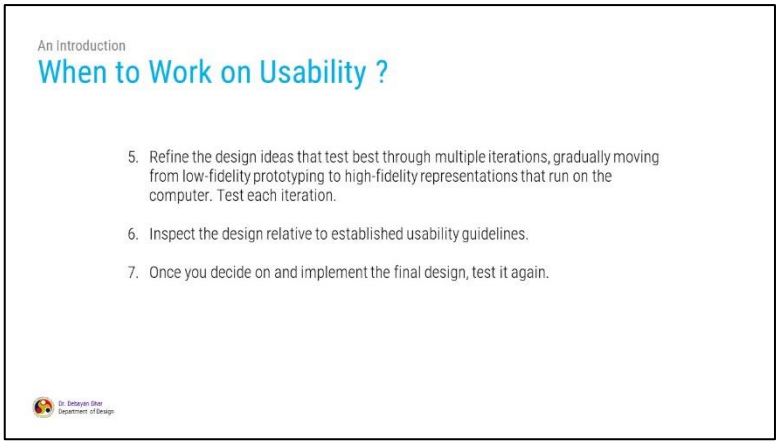

Refine the design ideas that test best through multiple iterations, gradually moving from low-fidelity prototyping to high-fidelity representations that run on the computer. Test each iteration. That is pretty important as we move ahead with our test from paper prototyping and as gradually, we move towards high level of prototyping, we have actual interfaces.

It seems that the interface is actually its working and we go and we go to our users, we ask them that to use it and to provide their feedback. We come across to the sense of what our actual users will feel. Now, remember, if you do not focus on this step, it might happen that after you release your product or you go to the market with your product, it may fall flat.

Because you have not tested it with your users and therefore, they will find lot of issues while their actual use starts. Inspect the design relative to established usability guidelines.

We will discuss about this as we move ahead in this course. We will talk about different guidelines, different protocols, different heuristics that as a; as an expert, as a designer, you must understand and refer to while you design these interfaces. And again, and once again, it is important that before you proceed towards the final launch, you must ensure that it is tested once again before you launch it in the market.

So, this was in short, what we are going to cover in this course. We will talk about in detail about the idea of usability, about the core philosophies behind usability engineering, we will also delve deep into the psychosocial factors of users, knowing our users how do they think, how do they process information, how do they make their decisions, what influences their decisions, how do they behave while they want to adopt a new product, how do they behave when they start actual use and post actual use what mood they create, gets created because of the use that happens; we will talk about all these important aspects in detail in this course.

We will also talk about the various techniques that are used by designers, by industrial designers, user experience designers in the industry, in the academia to extract data from their users. We will also talk about various experiments through which we gathered data from our users in order to understand the effect of our designs on them and most importantly, we will also cover the user centered design process.

So, this course will provide you with a holistic approach of what we call as the user centered design approach. The concerns, more specifically from usability engineering perspective that we must address in order to ensure that the product is successful and quickly gets adopted in the market and continue to be in the stage of usage for greater return on investment ok.

Thank you and we will move on to the next lecture.