

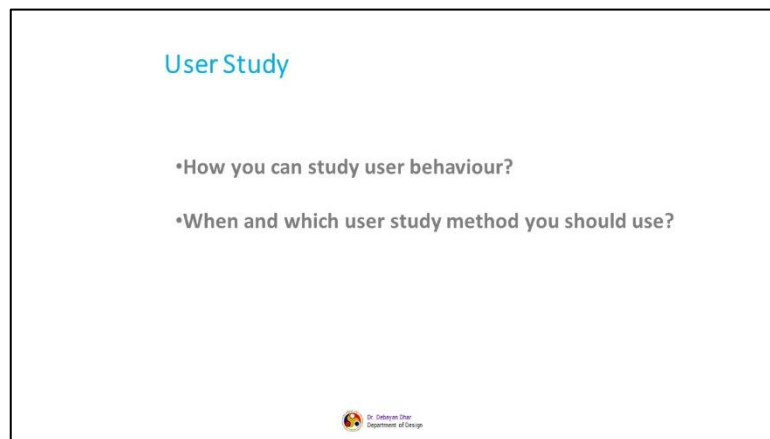
**Usability Engineering**  
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**Module - 04**  
**Lecture - 11**  
**Requirement Analysis - I**

Welcome to module 4 lecture number 11, until now we have discussed about the user center design thinking process. We have discussed about the various phases that are involved in this process and the ways through which designers employ them in order to design for the requirements that they want to address of the users of the representative users.

In this lecture we are going to discuss about the user study which comes under the empathize phase that we have seen and discussed in the last lecture. We start with the basic assumptions, basic foundational aspects of user study and then we will discuss about the tools and techniques of that let us begin.

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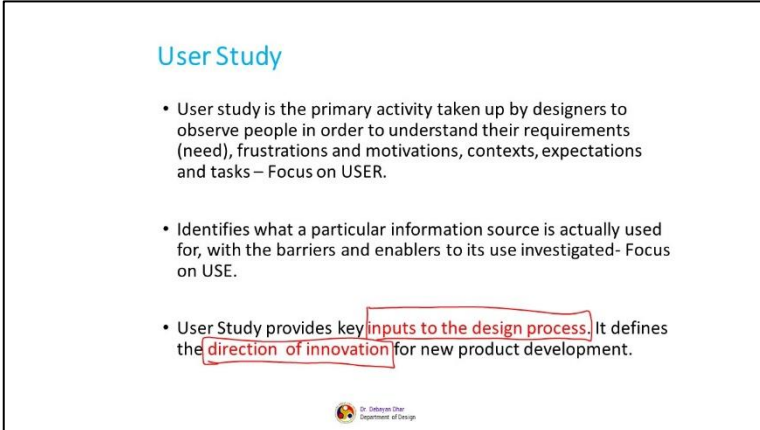
User study is the fundamental phase of the design thinking process that we have seen. The first phase which we have seen where it is being professed that we must empathize with our actual users starts with the fact that we conduct user study and we understand their concerns.

Now, the questions at this phase is how can we study user behaviour and when and which user study method we should use? If you look at literatures, if you look at various user

study literatures you would realize that multiple techniques, multiple tools are being used to conduct user study.

Now, there are reasons and situations when these tools and techniques are employed. What are those situations? What are those factors that govern the choice of going with one tool versus the other? We are going to discuss about all these things in detail in this lecture.

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**User Study**

- User study is the primary activity taken up by designers to observe people in order to understand their requirements (need), frustrations and motivations, contexts, expectations and tasks – Focus on USER.
- Identifies what a particular information source is actually used for, with the barriers and enablers to its use investigated- Focus on USE.
- User Study provides key **inputs to the design process**. It defines the **direction of innovation** for new product development.

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User study is a primary activity taken by the designer or his or her team to observe people in order to understand their requirements that means need, frustrations, their motivations to identify their context of use, their expectations and tasks. So, the focus of user study remains on the user and these parameters associated with the user. User study identifies what a particular information source is actually used for, with the barriers and enablers to its use investigated.

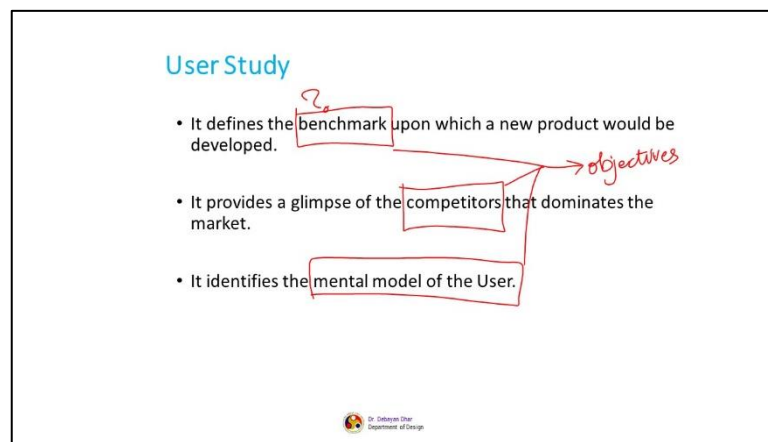
So, the focus here user study provides key inputs to the design process, it defines the direction of innovation for the new product development. If you realize in the last section of this slide you will see that these two aspects are highlighted. User study defines or provides a direction to the innovation; it is a phase that actually provides us with the input to the design process.

If you remember in order to ensure that we have competitive advantage. In order to ensure that we have a product that gets adopted in the market and we satisfy the unmet needs of our representative users we must define the direction of innovation. By direction of innovation we mean to define the perspective of the phase for conceptualization, in which

perspective should we conceive our ideas that is where a designer should focus during the conceptualization phase.

The input to this phase comes directly from the user study that you are going to do. So, the most important aspects for you as a designer or for your team is to understand that the focus of your user study remains on the user and on the context of use. And we do that in order to ensure that we can define the perspective of innovation, the perspective in which our concepts should be ideated.

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So, user study defines the benchmark upon which a new product would be developed. I would like to draw your attention on the word benchmark we will discuss about this. User study provides a glimpse of the competitors. So, many a time questions are being asked, how do we define our competitors? Who are our competitors? It identifies the mental model of the user.

So, these are the unique objectives of our user study, these three are the unique objectives of our user study. So, our objectives are it helps us by identifying the benchmark based on which a new product would be developed and it provides a glimpse of the competitors. Now, how do we decide on a benchmark? The question is, how do we define this benchmark?

If you understand that we are interested to conduct our user study in order to understand the use case, the scenario the specific scenario of the context of use of the of our users; what are the activities they are doing? Which are the products they are using? What are the situations under which they fail? Which are the situations that confuses them? Which

are the situations that motivates them? These are the specific questions that we are essentially asking the user study phase.

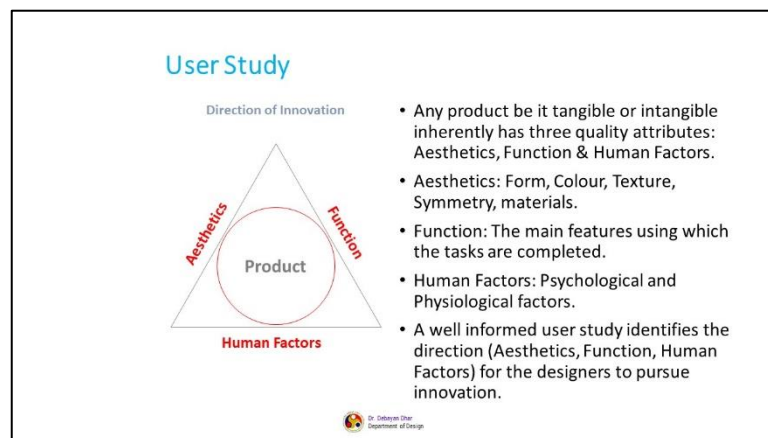
Now, the answers to these questions essentially provides us with the input what we call as the benchmark. The outcome of this study when we answer the questions which we raised, which we raised just now the answer to these questions allows us to identify and define the benchmark, the frame of reference for the product on which our concept should be established.

We during this phase we understand the use patterns of our user, we realize the different products they are using, we realize when a particular situation arises what is the first thought that comes in the mind of our user; these situations, these circumstances provides us with detailed information about the competitors. Competitors who are directly competing with the line of their products; competitors who are indirectly competing with the line of their products.

And finally, we understand the mental model of the user. Mental model of the user means, it means what does the user thinks when he is he or she is completing a task; what are the mental representations our user has, this defines the way the user perceives his reality and that is what we are referring to as the mental model, the mental structure of how he visualizes his reality; he visualizes how the product should be how to understand and interact with the product.

All these information's we derive from the user study.

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Now, in the last slide we talked about direction of innovation, we said user study if done accurately; if done correctly provides the design team with the direction of innovation. I would like to draw your attention to this slide and to this figure; what you see is a triangle, it has three sides. This triangle can be considered as the product having three important facets and the facets are the, aesthetic facet, the functional facet and the human factors related facet.

Now, any product whether it is a tangible product like a chair, like a table, like your mobile phone, like your lights, cars, vehicles, any tangible products or it may be any intangible products like software's, screens, UIS. They all of them they have these three quality attributes and these attributes are the ones that are being referred into the picture that you are seeing now.

These attributes are aesthetics, function and human factors. Any product that you take if you disintegrate the product in terms of their attribute you would see the way visual aspects of the product is, the way you see the product this is the visual realm of the product and that is where aesthetics part comes into play.

If a product is aesthetic it gets adopted at the initial stages, then comes the functional aspects of the product. Functions means the features that allows the user to complete the task take the example of a car, now the moment you see a car you understand its form, you understand its style and it provides an experience to you even while you are looking at the product.

It triggers an experiential aspect inside you, it might resemble something else or it might resemble a different thing but it triggers an experiential state in you. Now when you enter the car what you have as a driver, you have the steering wheel you have the different controls that you are going to use to ensure that you drive from place a to place b.

The various controls that are used by a driver to drive from point a to point b can be considered as the functions, while, how these controls are used; whether while using the controls they are easy to operate, your users can learn them are associated with the human factors' attributes of the product. The same goes with an interface with the software what you see in your screen represents the visual realm of your interface.

An aesthetics plays a major role in ensuring that the first level of engagement whether it happens in a positive way or the user for early adoption. After the initial adoption happens the user starts interacting with the interface through call to actions features. He clicks somewhere, he raises the query and the system responds accordingly to it.

These are the functional features of the interface that our user is using in order to communicate establish a dialogue with the system, with the computer system, with the software product, and while he is communicating whether he can recognize which feature to use, whether he can do it efficiently, effectively, he can learn the system quickly, whether he is satisfied the level of experience while using the product or this functional features are related to human factors.

So, this essentially you can see that any product can be classified into these three different quality attributes: aesthetics, function and human factors. So, aesthetics are related to form color, texture, symmetry, materials these all influences aesthetics.

Function are the main features which the tasks through which the tasks are being planned and human factors are the psychological and the physiological factors. So, a well-informed user study identifies the direction for innovation whether innovation should happen at the level of aesthetics, should it happen at the direction of function or should it happen at the direction of human factors.

When you have a product or when you have a scenario is your user looking for a product that is that looks pleasant; that means, it tells you as a designer your user is not happy with the aesthetic aspect of the product, with the visual aspects of the product. So, therefore, in your opportunity areas while you define your opportunity areas or your design brief you can specify the objective of your design process that the objective is to redesign the visual aspect of the product.

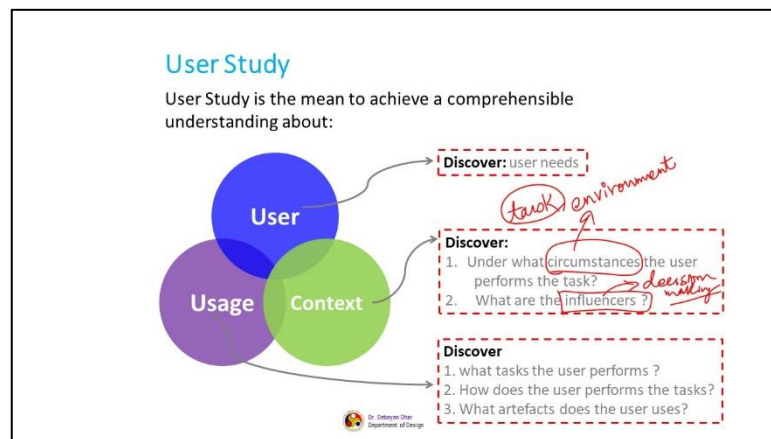
If your user is not happy with the way a product performs the user feels that the product does not addresses the requirement in the most effective way that means, he is looking at features that are redundant, that does not or that no longer cater to the requirements of him of the user, does not addresses the need of the user; that means, he or she is complaining about non-availability of functions.

So, if your user study details provide you with these kinds of information you know that while conceptualizing you are supposed to come up with features, you are supposed to come up with new functional features that addresses the unmet needs of the of your users and the same happens with the human factors attribute as well. There are features the product is aesthetic, but then your user does not get satisfied while using it.

The features are hidden in such a way or are being designed in such a way that it takes an enormous amount of time for your user to learn how to use the system. He is committing a lot of errors and then you realize that if this is the situation you realize that you need to address the human factors aspect of the product that means, during your conceptualization the focus of your ideas, the focus of your concepts should be addressing these factors whether their psychological and physiological factors.

Therefore, if you conduct a user study that is accurate that provides you with detailed information about these attributes of the situation of the scenario or even the product that you are focusing on. It will inform the direction of innovation for your design process, it will let you know during your conceptualization phase on what perspective should you start ideating.

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User study is the mean to achieve a comprehensible understanding about three important factors, and these factors are: user, usage and context. When we focus on user during the user study phase the focus is on identifying users unmet needs to identify their frustrations, to identify their pain points, the issues that concerns them and these concerns can be physiological in nature; these concerts can be psychological in nature.

The next aspect is on the context. The next focus is on the context while focusing on the context the objective is to discover under what circumstances the user performs this task, now here we are referring to the environment right and we actually mean environment as task environment.

So, the environment it can be the place, the situation, the artifacts, the various products that are present in the situation which influences the users while they are doing an activity and these can be circumstances can be influenced by the physical artifacts or places, it can also be influenced by the psychological aspects of the user.

So, when we talk about task environment, we talk about both these aspects the physiological aspects, the psychological aspects. What are the influences? When we talk about influencers we are essentially talking about decision making. You must realize the fact that while conducting user study the focus is on activity, the focus is on a scenario and what is a scenario? The scenario is a situation where a task is getting unfolded, a task is getting completed you are trying to understand those situations.

In what perspective in the perspective of how the users take decisions to complete the task and why that is important? Because, you must realize what are the entities or elements that influences his decision, how does he decide to choose a particular aspect or to take a call on whether he would be choosing for this versus that?

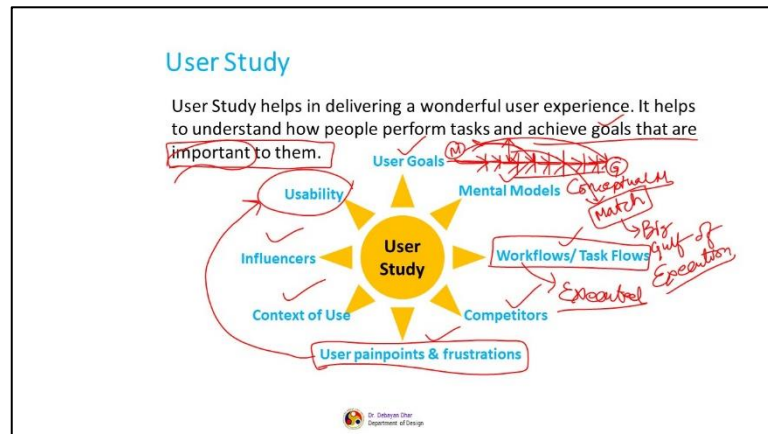
This kind of situations can only be understood if you dig deeply into the circumstantial evidences into the elements that influence's your user while they are completing the task or while they have completed the task and the third aspect is on the usage. So, in the context of usage the focus is on discovering what tasks the user performs.

We are essentially talking about the scenario. What is the scenario? What is the task that the user is performing? What is the process how does the task is being performed? What is the process of the task getting completed or whether at all it gets completed or not? What artifacts the user uses?

Now we are trying to understand the artifacts so that we can identify the influences that is our objective right to understand our influences. These are some of the important foundational concepts that we must understand before we start our using a tool or a technique for user study.



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Now, user study helps in delivering a wonderful user experience. It provides us with insights and based on the insights direction of innovation we conceptualize, we come up with ideas. Now it helps us to understand how people perform tasks and achieve goals that are important to them.

This is of paramount concern; how do they achieve their goals that are important to them. Many a time as while conducting user study we only focus on the issues or the tasks that are important to us, we never focus or we hardly focus on issues that are concerning our users and therefore, it is important that we understand how do they achieve their goals and which are the goals that are important to them.

So, user study is being conducted to understand the user goals, their mental models, the work flows or the task flows, the workflows and the task flows, the competitors, user pain points and frustrations, context of use, influencers and finally if you are studying an existing product if the study is focused on how your user is using an existing product.

We are essentially focusing on understanding whether the product is usable or not and understanding the pain points and frustrations to help the design team to understand about the usability attributes or factors of the product use context. Now, it is important here to understand that your user will have a goal.

He will have a goal and he will have a mental model a mental representation of how he come how he can achieve the goal and now you have your product or you have the situation that you are observing that is being focused on this way or this product allows him to execute the task in this fashion in order to achieve this goal right.

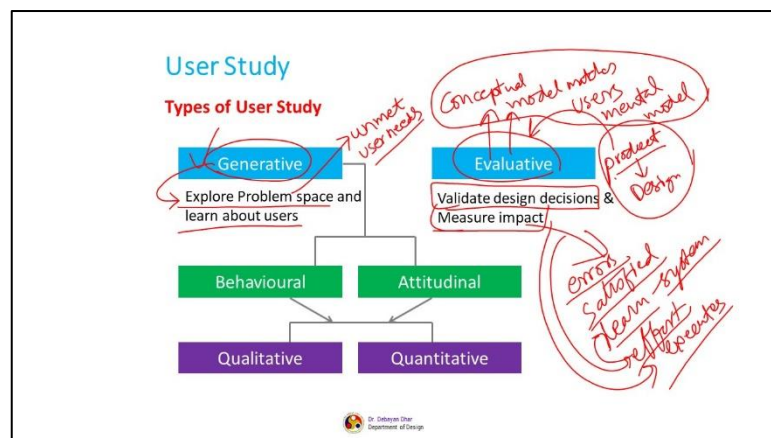
Now, the question is, does his mental model this one matches with the product concept? Does this match? If it does not match then we have what? We have, a big gulf of execution that means, the user has to jump or adopt to the mental model of the product as his mental model and the products conceptual model does not match.

And, we understand this by how by understanding how the task is being executed; how this task is being executed. So, our user study is so important for us, because is provided us with insights about all these important parameters and these parameters are important for us in order to understand the direction for innovation. We must understand which are the perspective in which we can come up with ideas.

We can come up with ideas from all three perspective. We essentially if we are focusing on a scenario where no product exists we essentially has to come up with a product that needs to be aesthetic, that needs to have a functional feature that addresses the requirements helps the user meet the requirements and also it has to be usable that means, we need to have features that addresses to the concerns of their physiological and psychological needs.

So, user study allows us to conduct all those things to understand all these things in order to ensure the direction of innovation.

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Let us now discuss about the types of user study. Now generally there are two types of user study in the design process you would realize that the different types of user study that we have can be essentially classified into these two categories: the generative one and the evaluative one.

The generative user study can be further classified into two approach: the behavioral one and the attitudinal one and the both these types of user studies can be further classified into qualitative type of user study and quantitative type of user study. While it may look like very compartmental, but in a good user study phase you can mix many techniques together.

It can have a mixed method approach where you have some aspects of quantitative inquiry and you mix it with some aspects of qualitative inquiry and you then figure out the specific issues that you need to address. Now, let us first understand what do we mean by generative user study. See the focus of generative user study is to explore the problem space and learn about users.

Problems phase means unmet user needs in classical ways, in classical descriptions design has been considered as a problem-solving activity. Essentially, we are talking about scenarios which we want to improve, it need not be always a problematic scenario, but as a designer we might feel that there is a possibility for improving the existing scenario to a much-preferred scenario and that can be our design objective.

So, now, in case of generative type of user study the focus is to identify this specific issue the issue from the user's perspective which we want to address. That means while using tools and techniques that help us to generate these issues we are essentially trying to define the pain points, the frustrations, the concerns of our users, of our representative users.

While the evaluative type of user study is being perceived differently. In an evaluative user study, we validate design decisions that mean you already have your product or your design, you already have the design or the concept or the product as a prototype and now you want to evaluate it to validate to see whether your design decisions or your concepts are working or not or whether the users are able to learn the concepts in the most least amount of time whether they are commenting any errors, whether they are satisfied with their use.

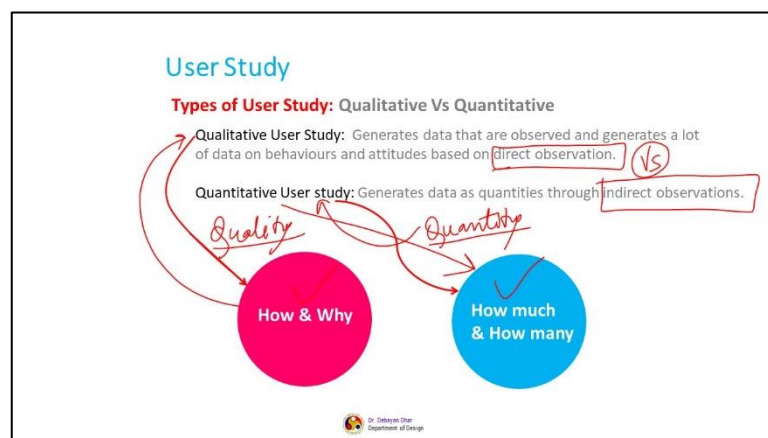
That means, we are trying to understand whether there is a match between their concept the products conceptual model and their mental model. So, this is called evaluative. So, the evaluation is between what. So, the evaluation is to see whether the products conceptual model matches the user's mental model right that is the focus of your evaluative user study that is the objective of evaluative user study.

It wants to measure the impact and the impact is measured in terms of the parameters that we have earlier discussed, how many errors your users are committing? Whether they are satisfied or not right how much time they take to learn the system. How much effort they have to put in to learn or to learn or to execute tasks right, these are some of the parameters on which the impact is assessed or measured.

So, what you realize is essentially for the perspective of the issues that you are going to address the type of user study will be dependent, if the perspective is to identify issue a problem space and to learn about your users you go for a generative user study.

If the focus is to learn how these concepts are being experienced by your users you go for the evaluative type of user study.

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Before coming to behavioral and attitudinal, let us first understand qualitative and quantitative, in short if you focus on the questions how and why, how much and how many you will realize the focus of qualitative and quantitative user study.

So, when we discuss, when we focus on questions like how and why, we are essentially focusing on qualitative user study. When the focus is on questions like how much so we are focusing on something about something that can be measured you know, quantity so it is about quantity, while this is about quality.

When the focus is on quantity measurement how much and how many we are focusing on quantitative use study. Now qualitative user study generates data that are observed and it generates a lot of data on behaviors and attitudes based on direct observation, while

quantitative user study generates data as quantities through indirect observation. So, the focus is on direct observational techniques versus indirect observational techniques that is the focus.

This is a debate whether you go for direct observation of your users while they are performing a task, or are you going for an indirect observation of your users while they are performing a task. That is the debate that we are going to understand the tools that we are going to discuss in the subsequent lectures.

Now, it is a debate and based on your requirement, based on the objective of your inquiry you must decide which type of technique you should focus on, are you for the direct observation or are you for indirect observation.

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**User Study**

**Types of User Study: Behavioural**

- Behavioral survey intends to enquire about factual circumstances.
- Behavioral study often probe incidents in the respondents' past.
- It seek to understand "what people do" with the product or service in question.

Behavioural type of User Study: Contextual enquiry (Qualitative)

\* It can become attitudinal based on the nature of questions being asked.

*Handwritten notes: "factual circumstances", "respondents' past", "Part Scenario", "Contextual enquiry (Qualitative)"*

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Let us now understand about behavioral user study. Now behavioral user study indent intends to inquire about factual circumstances here the focus is on facts behavioral study often probe incidents in the respondents past.

So, the focus is on past its sick to understand what people do with the product or service in question an example of behavioral type of user study is contextual inquiry; sometimes it can become attitudinal based on the nature of questions that are being asked. Now the important aspect here which I would like to draw your attention is on the aspects which are this that the focus is on factual circumstances and the focus is on respondents past.

We are more interested to learn about what happened with the respondent in the past. So, in behavioral studies the focus is on inquiry conducting inquiry about our user's past. So,

that they can present us with facts. So, we want to get into their memory, we want to see the information's about their frustrations, about the pain points, about the concerns and therefore we want to inquire about their past.

And when I say about past, I mean past scenario. So, the word past should be interpreted as past scenario ok, where you have a activity. So, contextual inquiry is a type of behavioral user study, but it can become attitudinal it is highly qualitative, while it is a mix of direct observation we see what the user is performing, but it also encourages questions that relates to the users past scenario what is performed. So, its it can be interpreted as a mix of what you are seeing in front of your eyes as an investigator and then inquiring about past activities.

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**User Study**

**Types of User Study: Attitudinal**

- Attitudes are general evaluations that people hold regarding a particular entity, such as an object, an issue or a person.
- These attitude reflect the individual's overall summary evaluations of an object, an issue or a person. The focus is to understand or measure people's stated beliefs
- They reflect the degree of positivity or negativity an individual feels towards an object.
- Attitudes are stored in memory and they remain somewhat stable over time.

Attitudinal type of User Study: Interview (Qualitative), Questionnaire study (Quantitative)

*Handwritten notes:* dig my feel → attitudes

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Now, the other type of user study is attitudinal it is called the attitudinal type of user study. Now attitudes are general evaluations that people hold regarding a particular entity and the entity can be an object, it can be an issue or it can be any person. Now these attitudes reflect the individual's overall summary evaluations of an object an issue or a person.

The focus is on to understand or measure peoples stated beliefs. So, we are focusing on the belief mechanism of our users. They reflect the degree of positivity or negativity and individual fields towards an object. Facts are stored in memory they remain somewhere somewhat stable over time. So, attitudes are stored in memory and we want to dig this out through using various inquiry techniques.

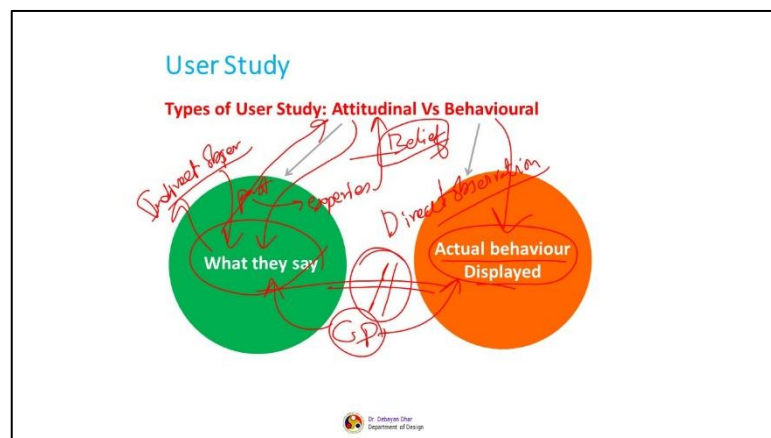
So, that we can learn about their attitudes to certain degree some of the types of attitudinal studies are interviews, questionnaire study and these are attitudes attitudinal surveys, they

dig into the attitudes in their past. So, what you see the difference between behavioral and attitudinal is something very complex. Attitudes are stored in memory, behaviors are also something that are stored in memory, behaviors are something that get triggered when a particular situation comes or the user is in that particular context.

It is very spontaneous in nature and it is influenced from his past experiences. So, a behavioral type of user study also incorporates the attitudinal aspect; that means, in a behavioral type of user study the focus is on having direct observation.

Similarly, we are also digging into the attitudes the past to interpret the users beliefs and therefore we must realize that it is a mixture of what we want to see, what is happening presently and what has happened in the past or got stored in the memory as attitudes in our users mind or memory that we want to dig out. So, that we can interpret their requirements their unmet needs in the most accurate way.

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So, summarizing these two types of user study we can say that when we are focusing on attitudinal, we are focusing on what they say while we focus on behavioral we are focusing on the actual behaviors that these types of people are displaying, that means, we are observing them it is a direct observation we are having a direct observation here right.

So, direct observation and this is what we are saying that is an indirect observation. Why it is indirect observation? It is indirect observation because we are inquiring about their past experiences that has shaped their attitudes, that has shaped their beliefs. So, therefore, we actually use techniques that are a combination of both even when you see we are focusing on contextual inquiry we are having direct observation as well as we are asking

our users questions to interpret what they say. So, that we can understand their attitudes right.

These are the primary ways in which various tools and techniques used in user study are classified.

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### User Study – Implications of Self theory

How do our users experience reality ?

In Thinking, Fast and Slow, Nobel Prize-winning psychologist Daniel Kahneman popularizes the idea of two selves: the experiencing self and the remembering self (Kahneman, 2011).

The experiencing self is that part of us that lives in the moment, cognitively, affectively, and behaviorally responding to life as it comes, for better or worse. The remembering self is that part of us that looks back and reflects on what we have experienced (Kahneman & Riis, 2005).  
“How are you?” is a question for the experiencing self.  
“How have you been?” is a question for the remembering self.

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So, after discussing about the different types of user study and the basic foundational concepts of user study let us now see how some of the psychological theories influences in the way we understand about users and one of the examples to it is the self theory.

Now, we must understand how do our users experience reality and we must understand the issues that concerns to the way they interpret reality. So, that we can understand, we can extract, and capture accurate data. Now the aspect of self theory that we are referring to is the one that was professed by the Nobel Prize winning psychologist Professor Daniel Kahneman in his book the thinking fast and slow Professor Kahneman popularizes the idea of two selves and these are the experiencing self and the remembering self.

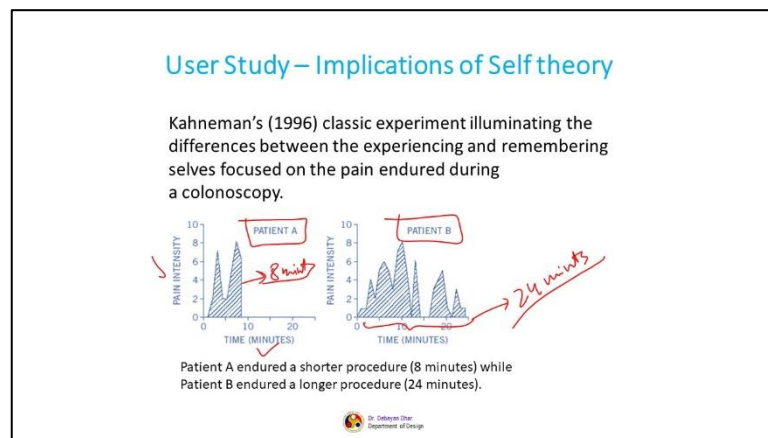
Very interesting it is a very interesting idea and experiment that he has conducted. Now what he says is that the experiencing self is that part of us that lives in the moment, it lives in the moment cognitively, effectively, and behaviorally responding to life as it comes, for better or worse, but the remembering self is that part of us that looks back and reflects on what we have experienced.

So, it is more about the past right. So, questions like, how are you? is a question for the experiencing self. While, how have you been? Is a question for the remembering self?



Now it is important for us to understand these two aspects of self as proclaimed by Professor Kahneman so that we understand the ways our users store information, we understand how our users experience a reality and what kind of information gets stored in their memory.

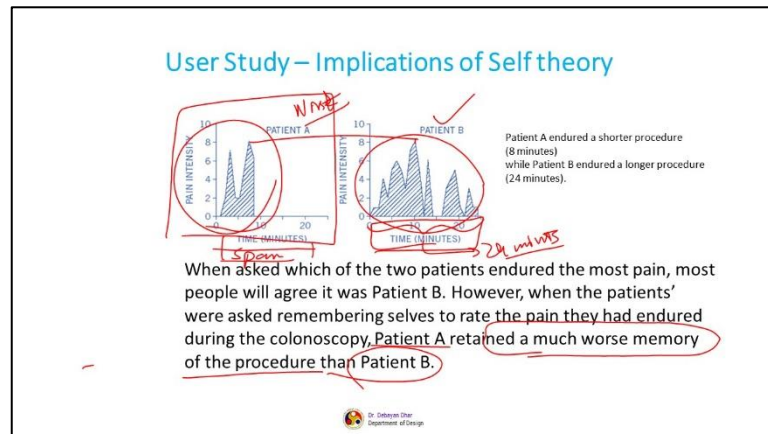
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Now, in the year 1996 Professor Kahneman did a classic experiment and his experiment eliminate the differences between the experiencing and the remembering self and he used an experiment by conducting colonoscopy in two patients. What you see in the graph is colonoscopy details of patient A versus patient B, you see two graphs that are spotted between pain intensity in the vertical axis versus time in the horizontal axis.

Now, patient A endured a shorter procedure. He might have endured a procedure of 8 minutes while the patient B has endured a longer procedure for 24 minutes. Now if I ask you the question colonoscopy is a painful experience those who have underwent this they can realize. Can you tell me which patient did had the most painful experience, what would be your answer? Let us see what Professor Kahneman got while he conducted this experiment.

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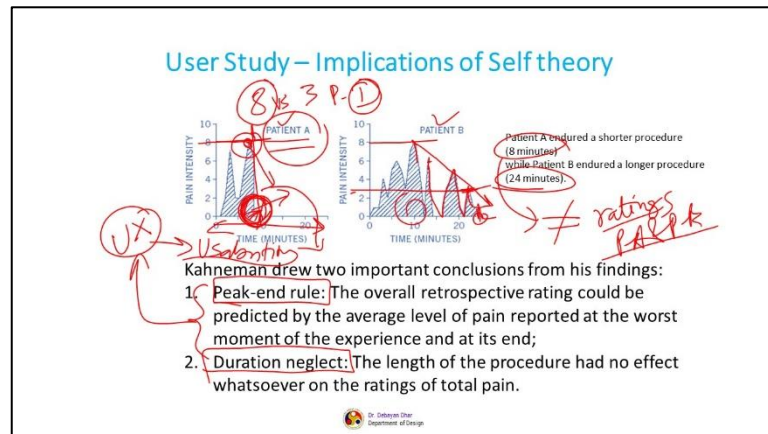


Now, when asked which of the two patients endured the most pain, most people will agree that it was patient B because he suffered for 24 minutes that is a long time; however, when patients were asked remembering selves to rate the pain they had endured during colonoscopy patient A that means this patient, patient A retained a much worse memory they retained a much worse memory of the procedure in comparison to patient B.

So, when the memory was compared when they were asked to compare their memories patient A had a much worse memory in comparison to the memory that patient B had and why, why that happened. Can you guess why that happened? You have both the graphs in front of you the one which had 24 minutes of exposure to that procedure and he had this many variation of pain both having the same peak.

But, this patient who actually had the lowest span of conducting the colonoscopy he according to his remembering self he had endured the worst memory; why that happened this tells us a story and this tells the story between the divergent thinking the divergent activities of the remembering self and the experiencing self.

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Kahneman drew two important conclusions from his findings and the findings he has presented with two important effects.

The first one peak and rule: The overall retrospective rating could be predicted by the average level of pain reported at the worst moment of the experience and at his end. See the peak this is the peak; this is the peak for both patient A and patient B their peak happened at this point almost at the same time; almost at the same time at around 10 minutes almost some minutes before or after.

But what happened for patient B it gradually reduced then again it had a peak then there was hardly any pain then again peak then there is an again fall then peak and gradually this subsided. So, you can see a gradual reduction while in case of patient A, it was a drastic reduction. So, the peak end rule says the experience at which you end at the last moment of when your interaction ends are important and that is the peak moment.

He finished his experience when the moment when the pain was at this level versus he who had the experience when the pain intensity was at 8 verses when it was around 3. So, it was between 8 verses 3 pain intensity and that this ensured that patient A had a worst experience remembering self which said that patient A had a worst that is what the patient has said.

The second important aspect is duration neglect: The length of the procedure had no effect whatsoever on the ratings of total pain that means, this 24 minutes and 8 minutes had no effect on the ratings by patient A and patient B. So, exposure to the pain does not have any effect what effects is the moment when the interaction gets stopped.

So, when the interaction ended what was the pain that predicted that can predict the ratings of a person in terms of how he would remember his experience? These two has a profound effect on user experience and usability. The peak and rule and duration has a profound effect on the idea of usability on the idea of the experience that that designers wants to deliver to their customers.

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### User Study – Implications of Self theory

The implications of Kahneman's findings are far-reaching.

- As his research suggests, what something feels like when we are experiencing it—the experiencing self—can differ dramatically from our memory of it—the remembering self. #
- Moreover, what we remember of an experience can be influenced heavily by its peaks or valleys with little regard for its duration. Extreme experiences in remembering self.
- Finally, our memory of an experience is strongly influenced by its ending.

Dr. Debayen Dhar  
Department of Design

Now, what are the implications of Professor Kahneman's findings? The implications are far reaching. His research suggests, what something feels like when we are experiencing it, the experiencing self. His focus is on experiencing self and it can differ dramatically from our memory of it, that means the remembering self. The remembering self essentially remembers and stores information and the; and these two are in contradiction to each other.

What the experiencing self stores and what the remembering self stores can be dramatically different, what we remember of an experience can be influenced heavily by its peaks and valleys with little regard for duration. So, only the peaks and valley. So, extreme experiences get registered extreme experiences right.

So, profound incredible outcome of what Professor Kahneman's work that extreme experiences get registered in your remembering self. These extreme experiences can be extremely positive can be extremely negative and finally, our memory of an experience is strongly influenced by its ending. So, the situation where the interaction is ending, the end part of any interaction any situation is profoundly important because it will influence the attitude that you will have throughout your life about that interaction.

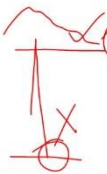
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**User Study – Implications of Self theory**

*Exp & Rem*

In the context of the colonoscopy study, the resulting question becomes: "What should the physician do?" According to Kahneman, it depends:

*1* If the objective is to reduce patients' memory of pain, lowering the peak intensity of pain could be more important than minimizing the duration of the procedure. By the same reasoning, gradual relief may be preferable to abrupt relief if patients retain a better memory when the pain at the end of the procedure is relatively mild. If *on the other hand* the objective is to reduce the amount of pain actually experienced, conducting the procedure swiftly may be appropriate even if doing so increases the peak pain intensity and leaves patients with an awful memory *time*



Dr. Debsuman Ghose  
Department of Design

So, coming back to the colonoscopy study the resulting question that comes in our mind is: What should the physician do? In this context Professor Kahneman answers it and he says that if the objective is to reduce patient's memory of pain, if that is the objective then you must lower the peak intensity of pain and it could be the most important then minimizing the duration.

So, the duration of the procedure is not important right, what is important is to lower the peak intensity. By the same reasoning gradual relief may be preferable to abrupt relief of patients. So, something that is gradual in nature versus something that is peak and then the end is happening this one is preferred this one not right.

Now, if on the other hand the objective is to reduce the amount of pain actually experienced. Now we are talking about two objectives here, first objective is to see if the patient's memory of pain can be altered or lowered. The second objective is to reduce the amount of pain actually experienced. So, one is related to the memory one is related to the experience.

Now, if we want to alter the level of pain that the user has experienced we must conduct the procedure swiftly. So, here it is related to time duration see the alteration now this is the dichotomy of the self theory; it is the experiencing self does not reflect what the remembering self stores and there is this difference in the information that are stored in each case.


While it is important to highlight that finally, it is the information that is stored by the remembering self that would define the attitude towards the situation.

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### User Study – Implications of Self theory

Kahneman presents this dilemma as a conflict of interests between the two selves.

- The experiencing self is the one that answers the question: "Does it hurt now?" — *present situation*
- The remembering self is the one that answers the question: "How was it, on the whole?" — *past*
- Memories are all we get to keep from our experience of living, and the only perspective that we can adopt as we think about our lives is therefore that of the remembering self.

 Dr. Debashree Ghose  
Department of Design

Now, Kahneman presents this dilemma as a conflict of interest between the two selves. There is a conflict the experiencing self stores a particular deformation while the remembering self stores a different level of information.

The experiencing self is the one that answers the question: Does it hurt now? The remembering self is the one that answers the question: How was it, on the whole? Now this is the difference it is the present situation versus the past that the self is got between. Memories are all we get to keep our experience of living and the only perspective that we can adopt as we think about our lives is therefore, that of the remembering self.

Now, why we are discussing the theory of self it is important for us to understand the contradictions in the mind of our user, how our user relates to the idea of self with the implications of Kahneman's theory of the pick and rule we know that finally, it is the remembering self that means, the duration of interaction of your user and the product will affect the experiencing self.

But, the attitude that your user will have will be dominated by his remembering self and that is therefore important for us to know that we must ensure that the peak experiences that are registered in the remembering self of the user are investigated, this is therefore, become so important that we inquire about the attitudes more. So, that we understand their pain points the extreme pain point the extreme situations that gets registered in the remembering self.

Here there is also a caution to all of you and the caution is remember that the information that are getting registered as attitude in your users, in your customers are the ones that has

meaning for your customers and users, they have these are extreme experiences, they have suffered and therefore they got registered.

It is not necessarily that these experiences would be all important for you now the caveat is if you have investigated with 10 20 30 users and you face a situation where you see a pattern of registration of these critical incidences, of these extreme experiences you know that this is the unmet need this is the experience that you need to address this is the experience that you need to convert from being extreme negative to a favorable situation through the intervention of your product, intervention through your software product.

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**User Study – Implications of Self theory**

Kahneman's research not only illustrates two divergent ways of calculating experienced utility (moment-based and memory-based), but it also provides much insight regarding the dominance of the remembering self over the experiencing self. He concludes that it is the experiencing self that actually does our living for us, but the experiencing self is largely lost to the remembering self.

Dr. Subramaniam Dhar  
Department of Design

Now, Kahneman's research not only illustrates two divergent ways of calculating experienced utility that means, moment based and memory based, these are the important foundational concepts that we are referring to it also provides much insight regarding the dominance of the remembering self over the experiencing self.

So, remembering self dominates the experiencing self. He concludes that it is the experiencing self that actually does our living for us, but the experiencing self is largely lost to the remembering self while you experience your daily activities your daily scenarios you understand all these, but none of these get registered because of the power of your remembering self.

The focus here, the main important issue that we must get from this discussion is that the focus on moment-based and memory-based scenarios. Direct observations are moment-based scenarios while conducting this kind of user studies. We are focusing on actual moments lived experiences.

We are seeing in front of our eyes the task getting unfolded while when we start inquiring about the attitudes of our users we are essentially focusing on memory based that means, the remembering self memories or information that have been registered in the remembering self.

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The slide is titled "User Study – Implications of Self theory" in blue text. Below the title, it asks "So how can this be applied to the design?" and states "Identifying key events in our user experience, especially focusing on what is happening when a user ends a task." The phrase "user ends a task" is circled in red, with an arrow pointing to the handwritten text "User Study". Below this, it says "And turn them into enjoyable moments are key to create a memorable experience that will leave the users happy and hopefully make them return to your product again." The phrase "enjoyable moments are key" is circled in red, with an arrow pointing to the handwritten text "Design / Ideas / Concepts". There is also a handwritten note "Impact" with an arrow pointing to the text "make them return". At the bottom center, there is a small logo and the text "Dr. Dilip Kumar Dhar, Department of Design".

So, how these all these important insights can be applied to the design. As I said it can be applied to our understanding of what kind of information we would like to capture from our users; from our representative users. It can also be applied by identifying key events in the user experience of our clients, of our users. In fact, especially focusing on what is happening when a user ends a task.

And then turning them into enjoyable moments are the key to create memorable experience that we will leave the users with the happy and hopefully an exciting experience that would make them return to our product again. So, when we refer to what is happening to with our user when the user is ending the task.

we are essentially talking about our user study focus while extracting inside from here we can now start focusing on the design aspect of how to convert this, if at all the experience is painful, if at all the experience is abrupt, if at all the experience is highly negative to convert that into enjoyable moments. Here we are focusing on the aspect of designing or coming up with ideas and concepts.



These are the implications of the theory of self or the studies conducted by Professor Daniel Kahneman on design process and user study.



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### User Study – Implications of Memory

Human memory is the natural storage for the data right in the human brain. It reacts to the outer stimuli, collects the data, processes it and organizes in different ways. Also, it enables a person to access the needed data collected in the memory when it's needed. However, it doesn't present the perfect mechanism as it's influenced by a big number of factors of physical and emotional nature.



So, while we are talking about the remembering self and we have discussed about Professor Kahneman's theory of self the remembering self and experiencing self we have been referring to memory and we must understand its implications to memory. So, that we understand what kind of information we need to drill from our user in order to define or accurately define their unmet needs.


So, human memory is the natural storage for the data in the human brain. It reacts to the outer stimuli collects data processes it and organizes it in different different ways. It also enables a person to access the needed data collected in the memory when it is needed however, it does not present the perfect mechanism as its influenced by big number of factors of physical and emotional nature.

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### User Study – Implications of Memory

Three types of memory:

- **Sensory memory** holds the data for a short moment when we perceive it with our physical senses like hearing, vision or touch; → *experiences self*
- **Short-term memory** (working memory) allows a person to keep some data remembered for a short period of time without repetitions;
- **Long-term memory** presents the storage for big quantities of diverse data which could be saved for long periods of time, potentially up to the whole lifetime.



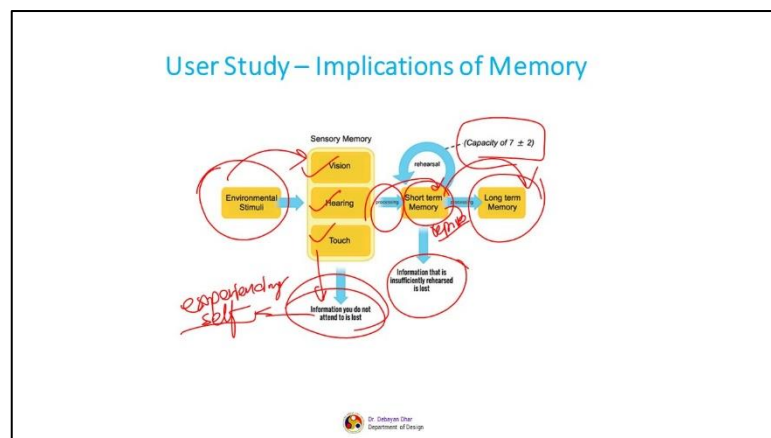
There are three types of memory and these are sensory memory, short term memory and long-term memory. The sensory memory holds the data for a short moment when we perceive it with our physical senses like hearing, vision or touch. We are essentially here relating to the experiencing self while we are talking of the sensory memory experiencing self.

The short-term memory which is often referred to as working memory allows a person to keep some data remembered for a short period of time without repetitions. You might remember that often guardians or parents ask students or ask kids to repeat read out loud and repeat some learning materials again and again and that helps these repetitions helps to enforce this content getting stored in long term memory.

Now if you are not repeating a particular content it is essentially stored for a small period of time in your short-term memory just for your immediate use. If you are not using it then it is getting lost it would get lost. Long term memory presents the storage for big quantities of diverse data which could be saved for long period of time potentially up to whole lifetime.

So, long time memory is something which is essentially huge, the quality aspect of this data is huge, it can get stored for long period of time essentially for the entire lifetime

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Now if you can see this schematic diagram you would realize that our sensory memory gets affected because of vision, hearing and touch and these are the information's which we do not attend to and therefore, these are something that get lost essentially we are referring to experiencing self.

The environment and stimuli also affect this and therefore, this is the real time experience that we are drawing from the circumstances. Now some of this information get processed and gets it here and if they are not rehearsed or repetition repeated they are being lost, otherwise if it gets repeated they go and get stored in the long-term memory.

Now, for us for us as human being and for our rehearsal and to get things stored in our short term memory its capacity is 7 plus minus 2 chunks; that means, this is the bits of information that we can store in our memory. We will discuss about this the Miller's Law has given us these applications the implications of this will discuss about these in subsequent lectures.

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**User Study – Implications of Memory**

Basic laws of memory

- 1. Concentration.** To remember a thing or chunk of data, a person needs to concentrate on it. Otherwise, the chances are high that the data will be discarded on the level of short-term memory. *lost*
- 2. Association.** The memory presents the huge network of links connecting different data. If a person builds the association which links the new data or object with something well-known or kept in long-term memory, the chances of memorizing get higher. *Connections*
- 3. Repetition.** It is one of the effective ways to activate the data in working memory several times until it moves to the long-term memory storage.

Dr. Chikeshwar Shear  
Department of Design

Now, the basic laws of memory: The basic laws of memory can be classified into three these are concentration, association and repetition. Now to remember a thing or chunk of data, a person needs to concentrate on it. Otherwise what will happen the chances are high that the data will be discarded on the level of short-term memory it gets lost. So, the data get lost if you are not concentrating.

Association: The memory presents the huge network of links connecting different data. If a person builds the association which links the new data or object with something well known or kept in long term memory, the chances of memorizing get higher. So that means, whenever a connection is established across contents or inform information the chances of it getting stored or for long term use increases.

Repetition: It is one of the effective ways to activate the data in working memory several times until it moves to the long-term memory storage that is what we have been referring

to. If something gets repeated again and again it can be a situation; it can be an information, if it gets repeated over and over again it gets stored in our long-term memory and how.

Because it is retrieved from our working memory several times and this retrieval ensures that schema is formed you know chunks of these are getting stored in our long-term memory which lies for an entire lifetime. So, things that are getting repeated in nature will get stored in our memory that can stay there for a longer period of time, probably for the lifetime.

These are some of the basic principles which we must understand and appreciate before we embark on user study we must understand to what extent our users focus on certain activities, what are the elements that draws their concentration, what are the elements that gets them attended to, what are the things that they are trying to associate with, and which are the activities that are getting repeated over and over again.

Not to forget the experiencing self and remembering self that dominates what they will remember and what they are experiencing. These are some of the most essential and basic foundational concepts before for user study, before we start talking about user study tools and techniques. In the subsequent lecture we will discuss about the various tools and techniques for conducting user study.