User Interface Design
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Lecture - 19
User Testing-II

Welcome students to the online NPTEL course, User Interface Design. So in this class we will discuss about the tools and techniques of user testing. So in the previous class we have talked about the user testing processes. We have discussed about the multivariate testing and A/B testing and then we have discussed about the different approaches of testing which is qualitative and the quantitative.

So in this class we will discuss about the different tools and techniques of the user testing process which can be applied in qualitative testing as well as the quantitative testing.

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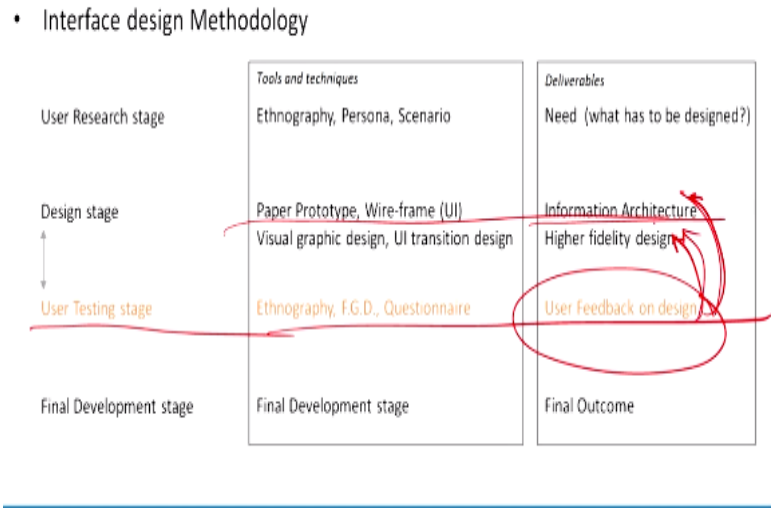

So this is how the generic design methodology looks like. So here we are discussing about the user testing where these are the tools and techniques and we take the user feedback of the design which goes to the high fidelity design or the low fidelity design which is information architecture. It is the low fidelity design which comes from the UI UX designers and the high fidelity design which comes from the visual designers.

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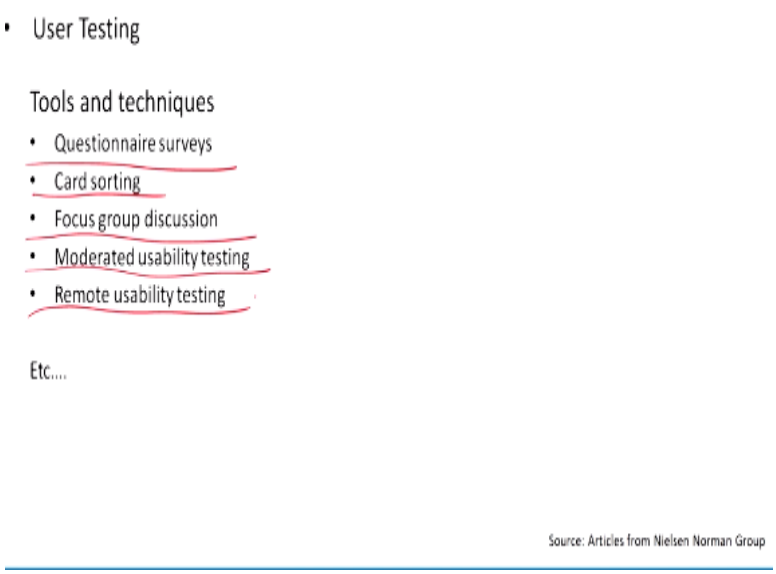

So these are the tools and techniques of qualitative and quantitative research which is for the user testing and then there are many other different tools and techniques based on the what you are designing for and what kind of setup you are looking at. So what is the experiment setup and what is the target audience. If the target audience is very different, if you are working with a child or disable or elderly or different kind of user group then your testing method might be different.

But these are the common tools and techniques which we deploy to understand the user testing process. So first is the very common is the questionnaire survey. Questionnaire survey can be remotely done. Questionnaire survey can be done personally. Then there is a card sorting. Card sorting we have discussed briefly in one previous class. We will discuss it in this class as well. And then there is a focus group discussion.

So this happens like a group discussion of different user groups. So there can be participants from different users so that there will be lesser number not like in quantitative method. So focus group discussion is a qualitative research technique, not quantitative research. Because they discuss and designers decipher how what is the meaning of what they are talking about and how their satisfaction level is there.

So in focus group discussion it can also happen with the experts, not the real user who are experts in a particular domain. So it can be a group discussion by the expert and then from there design idea can come or whose sound in the research of a particular domain of a product. So that can happen in the focus group discussion as well. Then the moderated usability testing which is done by a moderator.

And this is most likely to be into the qualitative research because moderator's role is more required in the qualitative research where they can shift the direction of the research question and the experiment setup. But definitely in quantitative research moderator is required when the moderator has to tell the users, so this is the setup and this is the particular task. But moderators there do not change the experiment setup and do not change the task and they conduct the testing..

So a moderator also is required when there are testing which is going on live. But there also can be a testing which is remote, is a testing which can be done, so forms can be sent online or can be distributed to the users. They will just fill up the form and give it back. And mostly this is required when we are targeting a large number of sample size. So that correlates mostly with the quantitative research technique when we need lot of data and numbers and which can be done remotely.

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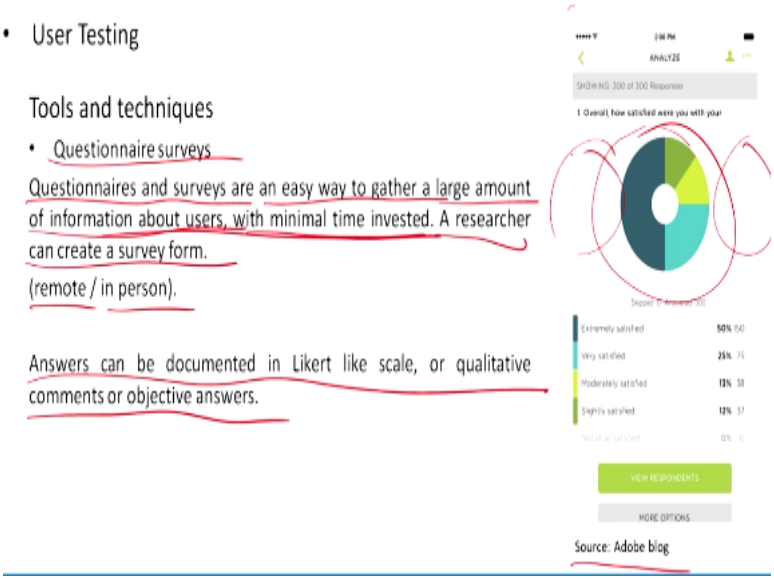

Now the questionnaire survey which is most commonly used and very easy to understand. So there we write the questionnaire relevant to what we are looking for and this can also lead to quantitative as well as qualitative research. Questionnaires are surveys when there are easy way to gather. This is a easy way to gather a large amount of information about users with minimal time investment. A researcher can create a survey form which is in remote or in person.

So this is useful when we create a large number, targeting a large number of users. So that relates with the quantitative research technique but questionnaire can also be descriptive when we give this descriptive questions to few of the users then that becomes a qualitative research and then they write their experience on the questionnaire. But that sometimes can be elaborative and that might take lot of time so that the users might not feel that kind of questionnaire.

So it is better to create the questionnaire for the yes, no question which is binary in answer or Likert like system which gives a value. So that will be easy for the user to understand. So it is more towards the quantitative research technique. Answers can be documented in Likert like scale or qualitative comments of subjective answer, both can happen. So this research tools and techniques are mostly taken from the Adobe blog. We can read the blog of this user.

They have written the different techniques and tools of user testing. So this is how it can be formulated through a infographics how many percentage have a satisfied with the performance of the product and there can be comparative pie charts. There can be also, we can understand how many people have completed the task and how many people have, what time it takes on an average to complete a particular task.

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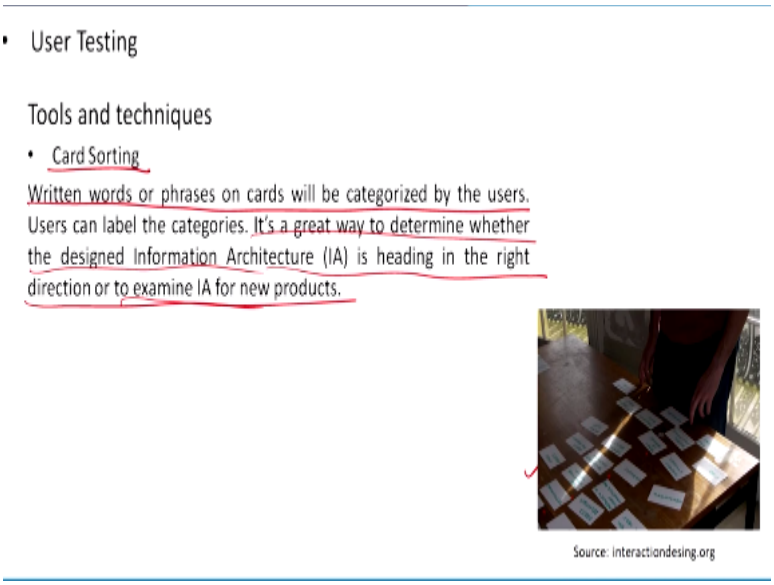

So another tool and technique is card sorting. So here you can see the process of card sorting. So written words or phrases on card will be categorized by the users. So this written cards of different words can be given to the users and this is very important to do a qualitative research. So there can be different emotions written on the card. Different usage of a particular product written on the card or anything which can be written on the card.

And then it will be given to the users and user will categorize them and they can also sort which they relate to. So that cards they will pick up so which they are relating to based on a particular task or questions given to them and then they can which they have sorted, they can prioritize the cards which are more relatable, which are not relatable and they can sort according to different categories.

It is a great way to determine whether the design, the information architecture is heading towards the right direction or it can examine the information architecture of a new product. To do that card sorting is one of the useful tool.

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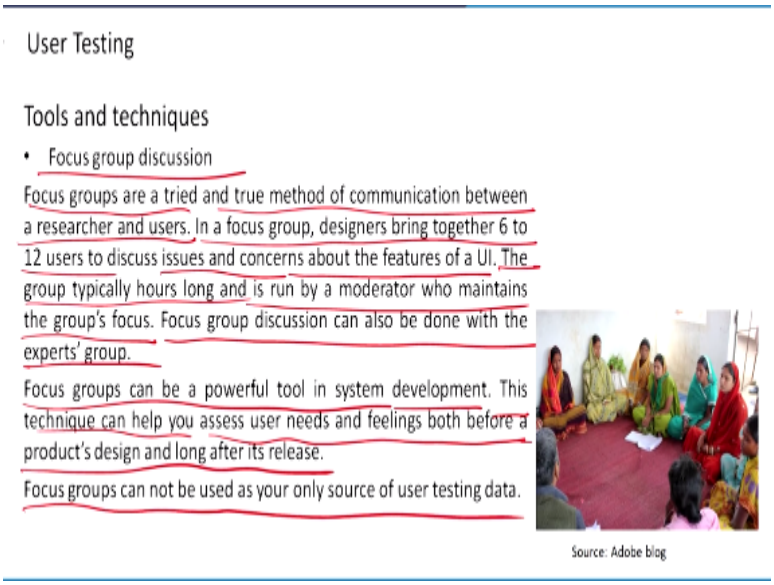

Now the next tool and technique is the focus group discussion. So focus groups are group of users which is used, so this method is used to communicate between the researchers and the users. So in a focus group, designers bring together 6 to 12 user in average, it can be more, it can be less, but it cannot be a very large number like a quantitative research because then everybody's opinion cannot be heard.

And there will be chaos between the group and everybody cannot give a in-depth opinion. So focus group are targeted for the few number of users and when they give a in-depth opinion and when another user is bringing out a point, the positive point of focus group is then it might strike to the other user that this point is also valid or invalid for that particular user. So new items can be brought, new direction can be brought in front of many people.

And then they can discuss on the new direction. So that is how focus group becomes a very important tool to find out a new way of discussion what direction which designers might not have even thought about it before. So they discuss on the issue or concern about the feature of a UI, user interface. The group typically goes on hours long and it runs through a moderator who maintains the group's focus.

Or the moderator can deviate the group's focus if he thinks that, that focus is not touched upon in the design but required for the design team to understand. Focus group discussion can also be

done with a experts' group. So instead of user group, they can be an expert group. Expert group might not be the real user. They might be the expert on a particular domain or the particular product. So they can be technically sound people.

There can be focus group discussion between the client and the technically sound people and the people who are specialist of the psychology of a particular, do research of a particular user segment. So they might not be the real user. So that can also happen and that can also lead to a different direction of the design. Focus group can be a powerful tool in the system development and while it is in the formative stage of design and the initial stage of design.

But it cannot be a tool to validate the design because few people's subjective opinion might in a discussion forum might not be just a tool for a user testing. This technique can be helpful for assessing the user needs and feeling both before a product's design and long after the release. Focus group discussion cannot be the only tool to use the user testing data because it has to be supplemented with the real question answer or the moderated design technique and the quantitative data.

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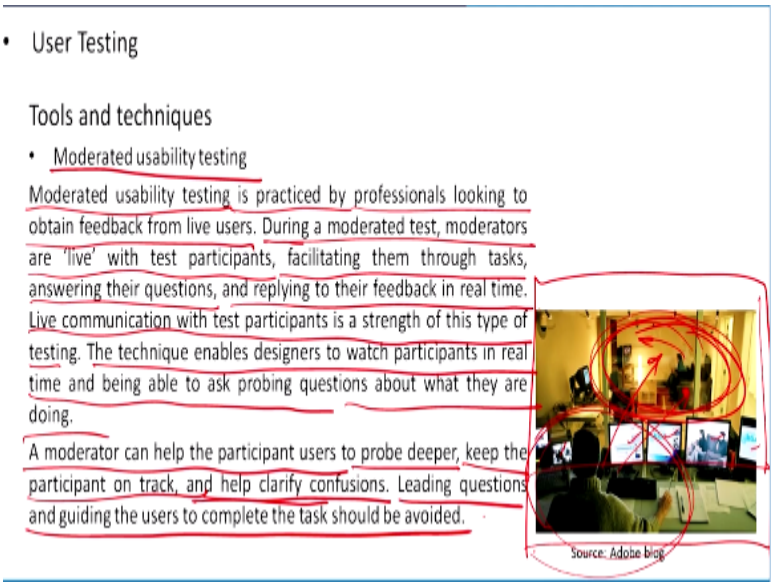

Then the other tool and technique is moderated usability testing. So moderated usability testing happens with the presence of a moderator. So moderator can see what users are behaving through a one-way mirror. So typically this glass which you are seeing will be a one way mirror in the

usability lab. So this moderator are seeing how user is behaving with a system and user is being observed by a moderator and moderator can ask user to do a different task and go to a different direction.

So moderated usability testing is practiced by professionals looking to obtain feedback from a live user in a experiment setup. During a moderated test, moderators are live with the test participants facilitating them through the task, answering their questions. If users are stuck somewhere moderators will talk and communicate with the user and then they reply with the feedback on the real time and they ask follow-up questions and go to a different direction.

Live communication with the test participants is a strength of this type of testing. The technique enables designers to watch participants in real time and being able to ask probing questions or the follow-up questions about what they are doing, why they are doing and this why questions which are very important for the qualitative research can be done when the moderator or the user researcher is there present in the user testing process while the user testing process is going on with the user.

A moderator can help the participant user to probe deep into the particular problem and ask this why questions, why you are feeling that and where are you stuck in this process and keep the participants on track and help them to clarify the confusion. But it has to be kept in mind that leading questions and guiding the user to complete the task should be strictly avoided. So moderator should not ask them leading questions.

So it is like, is it good or is it bad? So this kind of question, does it feel like this. So they cannot give the answer. So that should not become a leading question to the user, so user will fall in the trap and say yes it is. This kind of question should not be asked and should be strictly avoided and this might lead to a different direction which might not give the users real feedback on the design. And also they should not help the user to complete the task.

So if users are stuck somewhere, they should ask why you are stuck there and what is the problem you are facing? What can be the solution? These kind of questions can be asked. But

they should not help the user click on this and that is how complete the task. So that should not be done by the moderator.

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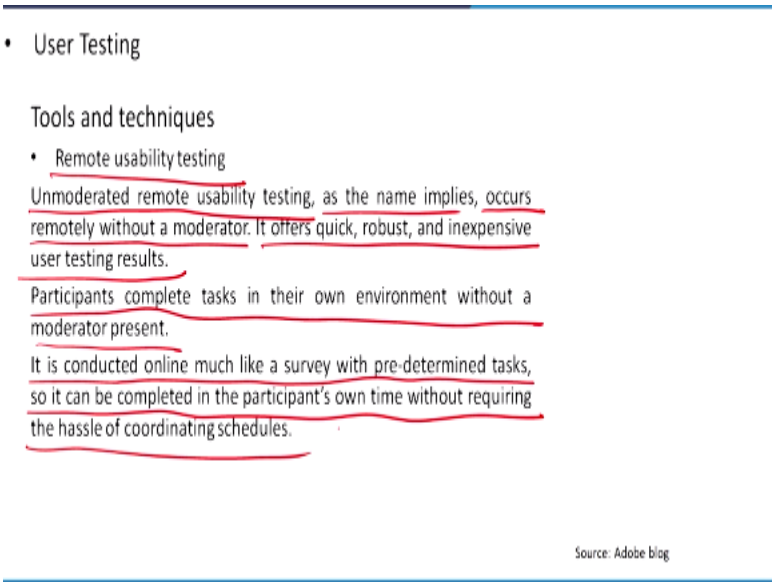

And the other technique is the remote usability testing which is more correlated to the quantitative testing. So this is unmoderated remote user usability testing as the name implies occurs remotely without a moderator. It offers quick, robust and inexpensive user testing results. Participants complete their task in their own environment without a moderator's presence. And it is conducted online much like a survey with a predetermined task.

So it can be completed in the participant's own time without requiring the hassle of coordinating the schedules. So that is why this becomes cheap and large number of sample size can be targeted so a questionnaire can be sent online or it can be distributed among the users and they can fill up the questionnaire according to their time and mostly this type of questionnaires becomes a yes, no question or a Likert like scale which leads to the quantitative research.

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These are the tools and techniques of research. Now we will talk about a digital device, this is a tool. So earlier those were the technique, more of a technique of the research and this tool eye tracker is used. This is a new device to use, it can be used by the users for the user testing. So other card sorting, questionnaire, those are the things which were used in a traditional way of testing and this eye tracker is a new device which can be used for the user testing.

And this is becoming widely popular. So this is the photograph of two different kind of eye tracker. This is a desktop mounted eye tracker and this is a wearable head mounted eye tracker. Desktop mounted eye trackers are capable of recording the user behavior through their gaze data or the fixation, where the fixations are happening on the desktop screen it is attached with. It can be attached with a fixed PC or a fixed laptop. So this is the eye tracker.

This is from the Tobii company, is attached with the desktop and this can record how the performance evaluation can be done of whatever digital display is there on screen. Whereas the wearable head mounted eye tracker looks like a glass. So there is a camera over here which records what users are seeing and then here there will be sensors which tracks the user's eye position.

So in the system what the users are looking at and what is their eye position that can be calibrated with the calibrator tool and based on that it will tell where users are looking at. So this

is useful to interpret how people are, users are behaving in a 3D environment and with a digital media which they can hold in front of their hand which is not fixed in the desktop. So this wearable eye tracker is more useful to understand the product if there is a, how they are performing with the product which is not a desktop or PC.

So if it is mobile users or a tablet user's performance is evaluated through a application which is openable on the mobile or tablet or any kind of other product how people are behaving with a tangible product like any product like bottle, refrigerator, or car, how they are driving and what they are seeing, how they are seeing the signages and how they are behaving in a shopping complex.

So that can be recorded in a 3D space of how they are behaving can be recorded with a wearable head-mounted eye tracker. So this is the kind of data eye tracker gives. It can give the qualitative data, it can also give the quantitative data.

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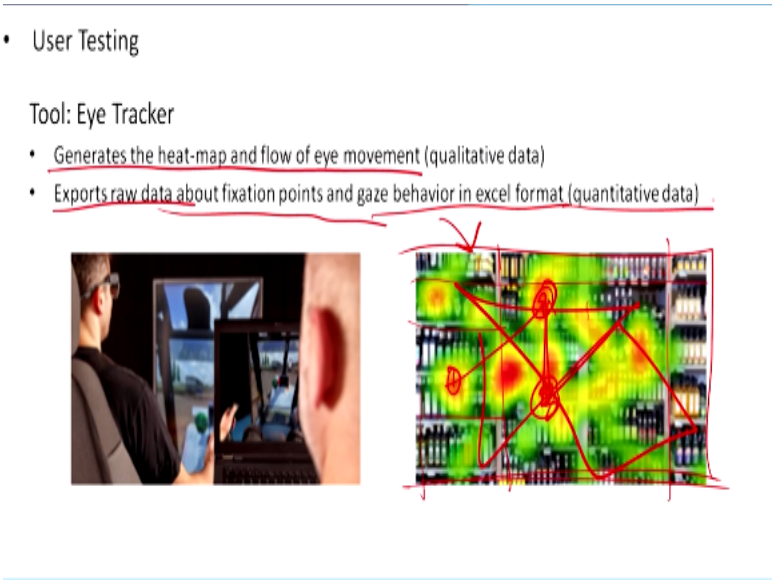

So what kind of qualitative data it gives. So it generates the heat map and he flow of eye movement. So this is a photograph of a heat map, what users have seen in a display system of a shopping center or where the products are displayed on a shop front, what people look at and which products are getting user's attention. So this is the heat map generated by the eye tracker and it can also give the eye movement.

So it can give the data where people have seen first, so number 1, then number 2 maybe, then number 3. What is the direction of eye movement and how in which path I have moved. So those kind of datas which falls under the qualitative data can be generated by eye tracker, both type of eye tracker, desktop mounted as well as the head-mounted eye tracker. It can also export the raw data about the fixation point and gaze behavior in excel format which is the quantitative data.

So it will also record the number of time I have moved in a particular area or the distance of the object and the x, y, and z dimension, what is the time duration and all this numbers and datas are also recorded in the eye tracker so that comes as a raw data file on the excel format. So that gives you as a quantitative data as well.

But you need to understand when to use the quantitative data, what should be the sample size, what will be the experiment setup, from the technique of the research and when to use the qualitative research what will be the sample size and the setup and other things, when to use that data from the technique of the research. So this is a tool, just a tool which facilitates both the qualitative and quantitative data. So this we have already discussed earlier.

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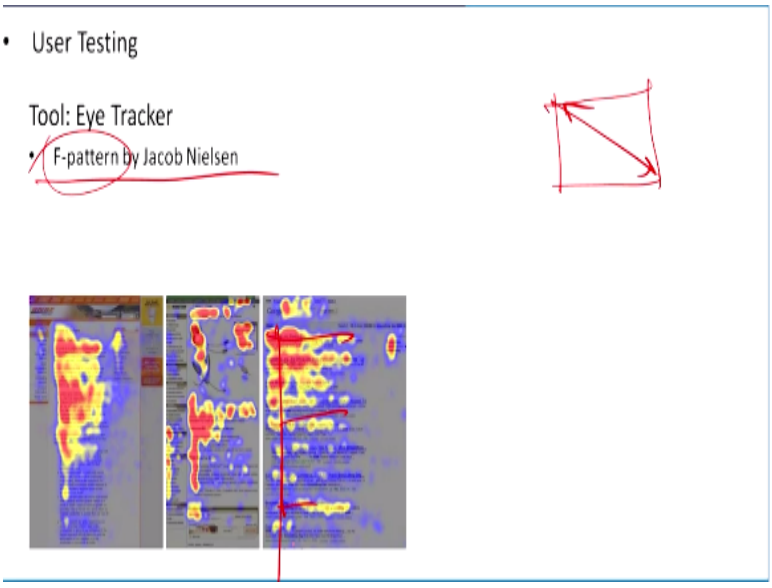

So this is a F shaped pattern by Jacob Nielsen which is done by Jacob Nielsen's Nielsen Norman Group and this is a eye tracker heat map data through which he have established the relooked at

the Gutenberg's diagram, how Gutenberg's diagram deviate from what Gutenberg have said from this four domains and how eye move to the digital media when they scroll and look at read the pattern. So he have come up with the F shape pattern.

We will read like, which looks like a f shape pattern and that is how people read. So this is a qualitative data or the heat map taken from the desktop mounted eye tracker. So I will give a case example of the user research through the proper technique through one of the example which has been done in IIT Kanpur's M.Tech student. So this is one of the example of a particular app design of how they have conducted the research.

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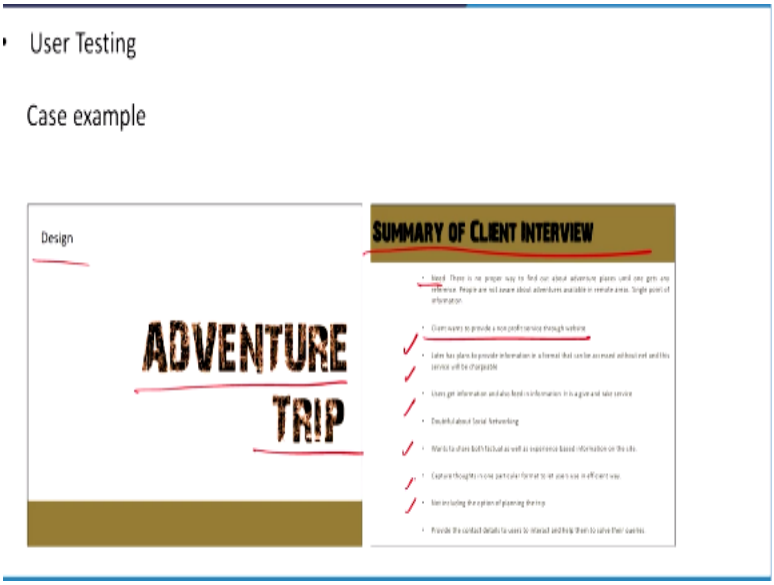

So this design was for adventure trip, some application has to be designed. So this is how they have come up with the sequential method of design. So first there was the summary of client interview. They have come up with the need statement and then what client wants and then other requirement from the client interview. So first it starts with the client who is proposing this adventure trip related web application.

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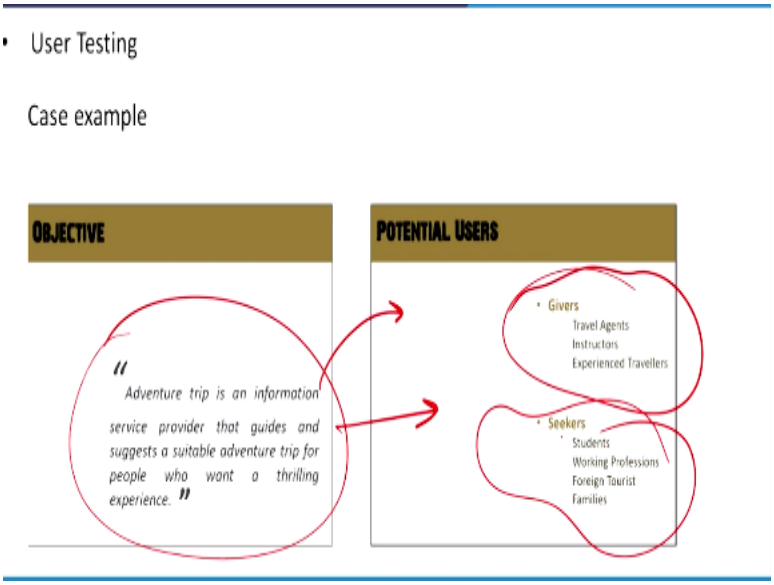

And then they have formulated the objective from the client's interview and the summary. Then they have gone for the potential target audience which client wants and they have understood that these can be the target audience of the particular application. So who is the data givers and the data seekers. So these all are different target audience or the different kind of users. From there the persona and the scenario will evolve.

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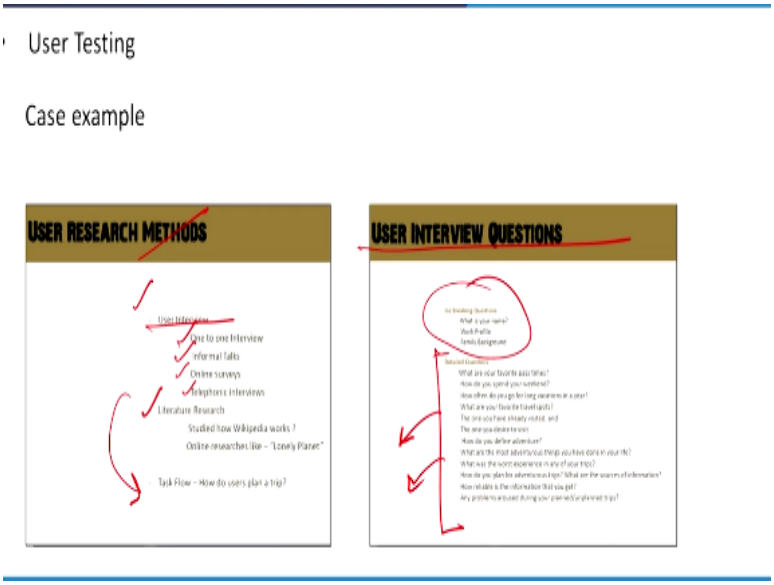

So after that they have gone for the user research methods and what can be different methods which can be or you can call it technique of research which they have formulated. One is the user interview which they will go and ask them one to one questions, informal talks, online survey which is not moderated and the telephonic interviews which is moderated but remotely done.

Then literature review has to be done which is the similar benchmarking of product, similar products of whether there is not and from there they will create a task flow which task has to be given to the users and how user will go about interacting with the particular session. So then they have formulated the interview questions. So ice breaking questions so that there will be a ease of conversation between the user and the researcher.

Then the detailed question which will lead to the feedback of understanding the design problem. So this will be qualitative as well as quantitative. Then they have, along with the questionnaire they have created different persona. I am just showing one persona. There are different persona's based on the type of users. So this persona caters to a particular segment of user, based on their demographic segregation and their task, what kind of task they are looking at and how they will interact with the particular web application.

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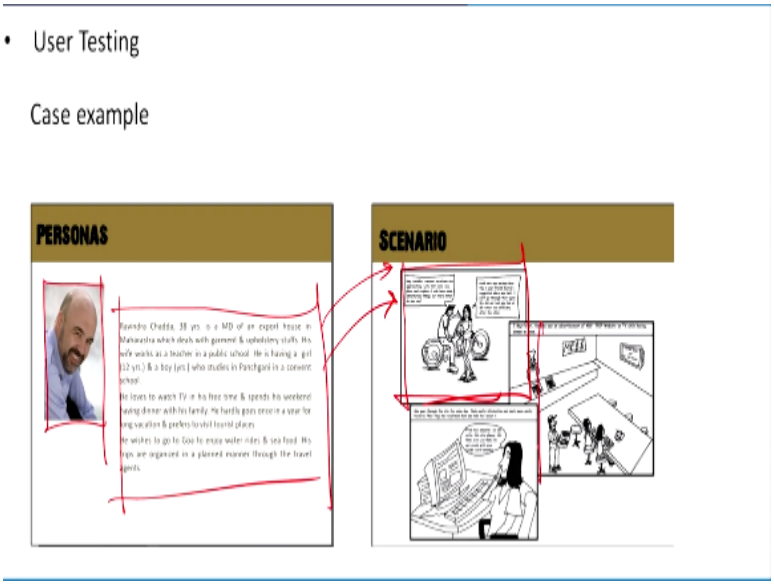

So they have given a particular photograph of a person who is the fictitious representative of this segment of user and the description of this person. And then they have created a scenario how this particular persona will interact with the existing scenario as well as the desired scenario. So I am just showing one scenario which they are talking about. So this they have made with the infographical narratives and with the storyboarding.

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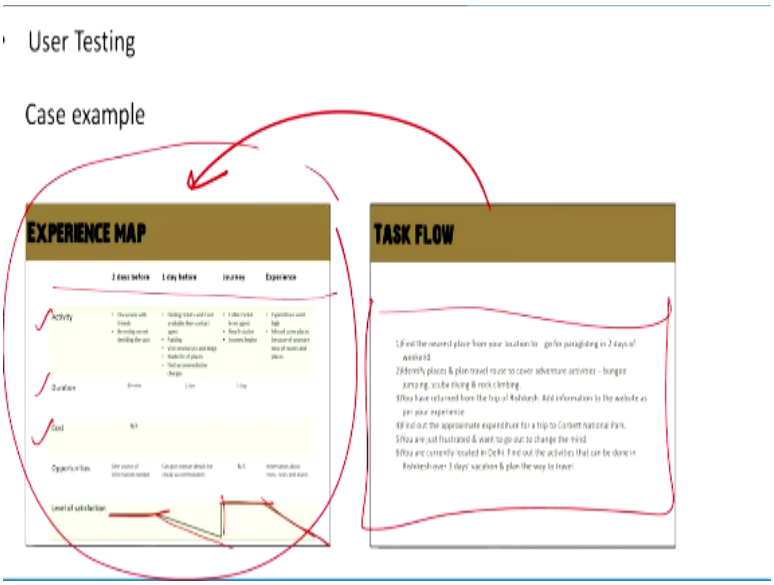

Now based on the research which they have conducted, this is the experience map which is outcome of the research. So research has been done after this stage when the scenario is built, all this techniques which they have formulated, they have gone for the question answers, they have gone for the discussions and other techniques which they have identified will be suitable for a particular this case example.

They have summarized it in terms of experience mapping how user satisfaction level is achieved or not in a particular task flow. So this satisfaction level can be mapped either by qualitative research technique when we ask question what you are feeling about this in design so they have definitely gone before this, they have gone for the low fidelity design and then they have asked these questions.

And then also it can be done with the quantitative research when the users will mark the rating of the satisfaction. So the satisfaction level is shown in a graph. It can be shown in a different way in pie chart and in any other format based on how you want to show the information into the as a infographics or what kind of infographics. So this is the activities, different activities, duration, cost it is required and the journey of user.

Then the task flow they have mapped, so these are the task which will be given. The task was there which based on that they have conducted the user testing and the experience map was generated from that.

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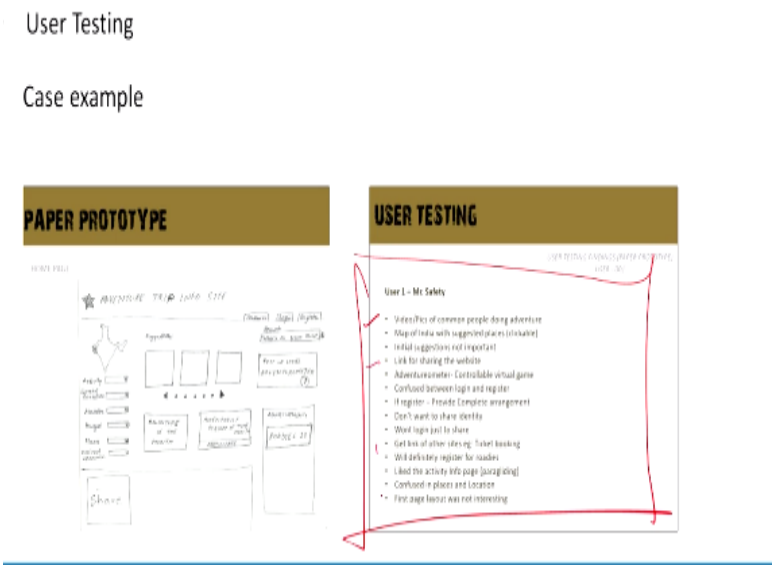

These are the paper prototype which they have shown to generate the experience map while they have collected the data. And these are the user testing inferences they have taken from the case example. So these things are there. And this is how they have conducted the user testing. So this is just an example. There can be multiple different method which I have discussed from the tools and techniques you can deploy different methods.

You can deploy eye trackers. You can deploy other focus group discussions and different tools and techniques and mix and match and which will be apt and suitable for a particular design which we are looking at. Thank you.