Usability Engineering
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Module - 12
Lecture - 38
Effective Contextual Enquiry

Welcome to module 12 of Usability Engineering class. My name is Neelarnab Dutta, I am a research scholar Department of Design, Indian Institute of Technology, Guwahati. So, in this lecture we will discuss how contextual enquiry can be made effective and why it is important for an effective contextual enquiry.

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So, let me first give a brief about various contextual enquiry methods. We have already learned in our previous lecture, lecture number 14 and 15 about various techniques like interviews, surveys, MPT mapping etcetera.

But here I am trying to organize various methods into two categories, there are two types of contextual enquiries one is broadly known as primary source techniques, which include observation techniques, field study, interviews, survey, user shadowing, focus group study, etcetera. And the other method is a secondary source technique which is mostly based on existing knowledge database of information, which are reliable and credible.

So, such sources of information can be resource articles, media reports, books, scholarly

reviews, etcetera. So, what are these various techniques and how they help in the contextual enquiry method? Among the primary source techniques, we have observation. So, in observation a designer or a researcher personally try to see what actually is a problem, in reality. This technique is very much useful in realizing the problem from the designer's own perspective.

The other method is field study, where you go to field; that means, the scenario where there exist a problem and you engage in various activities of data collection to understand the context, and then gather the requirements and the user needs. The third method can be interviews which is, when you ask questions to the user stakeholders directly face to face and to get information out of them. So, an interview can be structured, it can be semi structured and unstructured.

These protocols already we have discussed in the previous lecture, lecture 14. Another method is survey where we created questionnaires which can be both qualitative as well as quantitative. And we send these survey questionnaires across a set of people and those inputs are later analyzed based on some statistical methods to gather information, to know about the problem and needs.
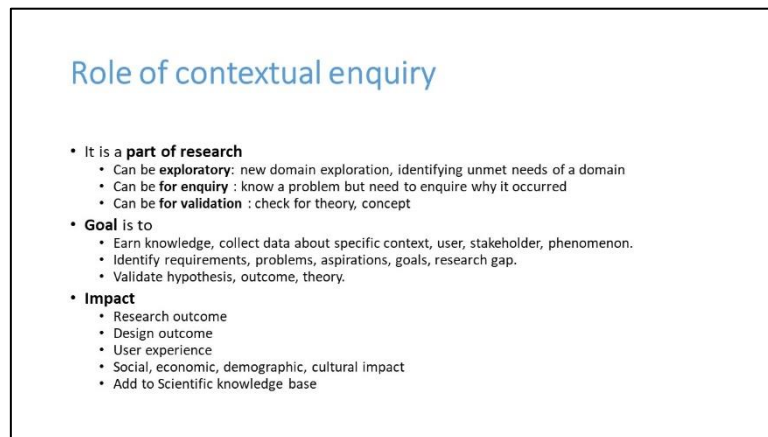
Another type of contextual enquiry method which falls under primary source technique is user shadowing. So, in certain scenarios where you cannot affect the user activities, you do not want to disturb the day to day activities of the user, you do shadowing. So, basically shadowing means you follow the user without actually knowing, informing him what is your intent and what information you are collecting. Also, its needs to be ethical, ethically approved to conduct such studies.

The last technique used for primary source information gathering is focus group discussion, where do you discuss with field experts, the domain experts and you discuss about the scenario and try to grasp the problem, the underlying context and use that information as fast and experience information, experience data.

Research articles, media reports, books, scholarly reviews, are also sources of secondary techniques which are also widely used, when the information you are looking after is already

there it is a known knowledge. But you need to look for credible and reliable information.
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So now, question is why contextual enquiry is important. So, as a part of user centric design process, as a designer we often came across the user research phase, the design research phase where we try to do certain research, which can be exploratory means the designer may not have the existing domain knowledge. And he is trying to go into a new field setting and try to identify unmet needs from a domain in which he is not specialized.

Another kind of contextual enquiry can be enquiry based, where the problem is known, but and the stakeholders also sometimes known, but you need to enquire why it is occurred. So, you go to the scenario, the setting and interview people or try to observe use various techniques, like observation, shadowing and try to get to know about the context and the problem that user is facing.

The third kind of contextual enquiry can be for validation, which is mostly based on theory or concept. If you have some concepts and you want to validate that then you reach to the user, you reach to the stakeholder groups and try to validate those through a couple of studies. So, overall goal of contextual enquiry is to earn knowledge, collect data about specific context, where user, stakeholders are involved using various techniques. You identify requirements, problem, aspiration, goals and research gap.

So, these are important aspects why you are involved in a contextual enquiry process so that you get the initial input to start with your design process. And lastly to goal is to validate certain hypotheses that you have thought of or you want to validate certain outcome, theory, that you have been involved in. You have a definite belief which you think may be possible in that particular context.

So, how contextual enquiry impacts the overall design or research project? The contextual inquiry it is the first step towards any research which can actually impact the outcome of a research. It if it is a part of a design process then it impacts the design outcome.

Similarly, if it is a part of user experience solution then it impacts the ultimate user experience and above of all, at the end your solution which is based on your initial contextual enquiry impacts the society, the economic aspects of it, the demography and the culture which is the reason why contextual enquiry to be efficient is very important. And lastly contextual enquiry also adds two scientific knowledge bases.

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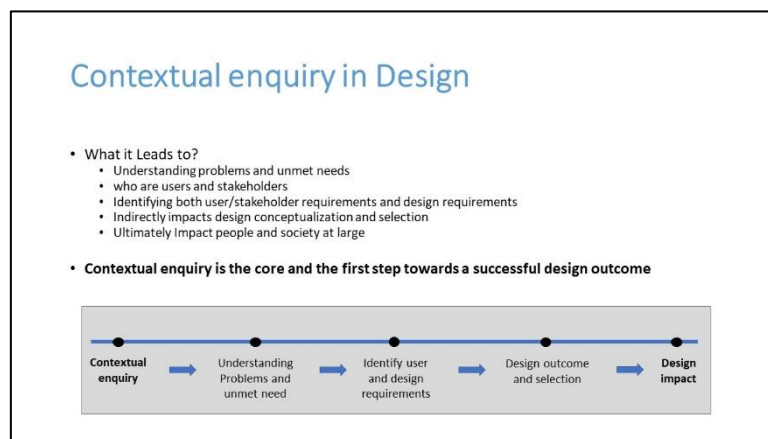
So, how contextual enquiry is involved in design process and what it leads to? So, contextual enquiry leads to understanding of a problem and unmet needs, it let you know who are the users

and who are the stakeholders. It helps in identify both user and stakeholder requirements and the design requirements which you derive from those, based on those. And indirectly it impacts the design conceptualization and selection phase and ultimately it impacts the people and society at large.

So, if you look into the picture here, it shows that contextual enquiry is the core and the first step towards a successful design outcome because it is the very first step which actually determine, what will be the design impact after going through all the phases of a design process. (Refer Slide Time: 09:14)

It is very important that the contextual enquiry we perform is reliable and valid. Now, what is reliability and validity? Let us come to reliability first, as scientific knowledge reliability means consistency of a measurement tool or method or a skill and if that same measurement is repeated again, it should give the same results.

For example, if we are using a weighing machine every time to measure your weight and it gives the same measurement that is your weight, in case thence you can say ok this particular weighing machine is highly reliable because it gives a measurement that is error free, within a standard deviation of one percent maybe.

However, if a device or a thermometer for example, if we take an example of a thermometer and every time we measure our body temperature and it gives different results, then we can say that instrument that method or that tool is not reliable.

And it happens often, if we see blood glucose monitoring devices they often give various reading every time you try to check your blood sugar measurement, the devices give reading which is probably 20 30 plus minus every time so; that means, those devices are not very reliable.

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Next is validity; so, validity means degree to which a measurement tool measure what it claims to measure; that means, if a weighing machine is meant for measuring weight; that means, it is a valid instrument. I cannot use a thermometer to measure my weight.

So, thermometer is not a valid tool; however, let us take an example can we measure a weight of an elephant using simple household weighing machine? Now, here comes the question, though the units of measurement is same it is kg, it is the weight; however, the range of measurement that can perform by a household weighing machine is not within the limit of weigh of a elephant.

So, in that case a household weighing machine is not a valid tool to measure its weight. For that we need to procure a bigger weighing machine that have a higher weighing range and then that will be a valid tool or valid method. Here is another example, if you are trying to measure temperature of water using a metre scale, then the metre scale is not a valid method ok. So, it is called invalid.

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So, it is very important that when you perform contextual inquiry the techniques, the methods you used falls under the category of validity and reliability. You should have a valid and reliable method and tool to perform contextual enquiry. Otherwise, your outcome from a contextual enquiry may be biased or may not be valid in terms of the technique you have used to measure it. However, reliability and validity are terms that are mostly useful for quantitative research, where statistics and measurements are involved.

So, in qualitative research and in contextual enquiry we use the word trustworthiness. If you see mostly when we go for a contextual inquiry, we perform observations or we do field study, we take interviews whatever inputs we get is in the form of qualitative information. The nature of the inputs may be our dialogues, may be some descriptions. So, those are qualitative information we use the term trustworthiness, it is the trustworthiness of a contextual enquiry that can predict the possible design impact of a design solution.

So, as a researcher or as a designer our goal is to make the contextual enquiry trustworthy and it is a strategy also to be implemented so that later you do not suffer, because your usability of

your solution may suffer later, if you do not correctly capture the user research part. Your, design outcome can be misaligned or ill positioned with user requirements and aspirations.

So, it will give negative or poor user experience. So, how applicable is this idea of trustworthiness in contextual enquiry metals; so, here we go. You need to check the right population, who are the stakeholders, users, what are the context where to conduct the contextual enquiry etcetera. So, imagine you are trying to develop a medical device probably for some low resource setting.

However, you belong to a urban setting. So, you do not have a access to such a setting. So, if you do a contextual enquiry with a sample population that do not belongs to that load resource setting, then your contextual enquiry will not be trustworthy, it would not give trustworthy results.

Many times, researchers use own comfort for accessibility of population to do such contextual enquiry and which is wrong. If you are trying to do some design intervention for some specific population, then you should have the data from that particular population. So, that is very important.

Second thing is like need to check the sample size. This means how many evidences we have, how often it repeats here an example. So, this is an example which I came across that is one Muslim lady has vitamin D deficiency and we try to understand why this happens. And someone in our design research team say maybe it is because of their apparel burka whose which they wear and they do not get enough sunlight.

However, we cannot predict this based on only one sample study, we need to see if 1000 or maybe 500 ladies across a demography have similar deficiency, then only we can say that yes, it is that apparel which results in vitamin D deficiency. Similarly, when you do clinical immersion to study unmet needs you may came across certain patient which may give you some information about their pain, about their suffering, and they say that the reason for that is this particular clinical condition.

No, you cannot judge based on that. So, you need to see how many patients of similar nature

report it the same problem and how often this occurs. So, based on this only you can later conclude that this is the problem and this is why we need to solve this.

So, it is very important that we check the right sample size. The third aspects of why its needs to be efficient contextual enquiry is that contextual enquiry needs to be chosen based on the requirement, the technique needs to be chosen based on what is required. You need to ask yourself as a researcher or as a designer that is it the interview, observation survey or anything else will help in capturing that information.

For example, will a patient interview will let you know the clinical problem? Because patient interview will give you the suffering he may face in day to day life; however, the clinical problem validation and information about the clinical problem only will get when you interview a doctor. So, the technique of interviewing the patient is not a good idea.

Similarly, the focus group discussion to understand the user suffering is again a not a right technique to get the user information. Because now you are trying to understand the user sufferings, but you are not actually visiting the field to gather that information. Instead, you choose a route which is more comfortable and accessible to you and you discuss the things with a focus group.

Yes, focus groups are experts in their domain and they know those information's, but you do not get the information from the mouth of the horse. It is the secondary information which flowed, which flows from the patient to the focus group the experts and from the experts you are trying to get the information and which is often not very efficient when you are trying to do user centric design.

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Effective contextual enquiry

- We should strategize to enhance trustworthiness of a contextual enquiry because
  - The context or domain knowledge can be alien to you. Eg: A novice designer working in a medical device design project, where the clinical context is unknown.
  - To avoid personal biases in the process. Eg: A designer's previous perception can bias the current contextual enquiry process or outcome.
  - To make the design process decisions logical, scientific, verifiable

So, what is effective contextual enquiry? Effective contextual enquiry means we should strategize to enhance trustworthiness of a contextual enquiry, because the context or domain knowledges can be alien to you as a designer or as a researcher you may not have the domain expertise every time. When you perform a contextual enquiry for a new field, then you cannot rely on your past knowledge or your perception about the problems.

So, you need to trust on the methodology you follow the tools you use to gather the information. So, the way you select the tools, what tools you have selected and what sample size what population you select all can impact your final outcome of your contextual enquiry process. The second thing is like in order to make making trustworthiness, in a contextual enquiry process avoid personal biases in the process.

So, if you have a team of designer who have a prior experience in designing, some particular solution related to maybe electronic devices. Then when he identifies similar issues, then he always relate the past experience in the new information gathering and which bring biasness to the new information extraction process.

And the third aspects why you need a effective contextual enquiry method process is to make the design process, process decisions logical scientific and verifiable.

So, what are strategies for trustworthiness. These strategies are based on scientific research and these are widely practiced for making the enquiry trustworthy. The first method is data triangulation. So, data triangulation means, you need to collect data from various sources, various demographics and various population and there should be maximum variation. So, imagine you try to develop some solution that is related to Indian culture.

So, probably for example, you can think of designing some ornaments for Indian women's; however, you studied only a population which is belongs to some Indian state and what will happen that, the design outcome will only get accepted by that particular population. So, in order to make the design acceptable to a white population and that was your vision for this the project. So, you need to collect data from a wide population sources ok.

Another example can be for example, you are saying that you are trying to develop a medical product for developing countries, who its so the key scenarios are maybe resource constraints. So, you say that India is a developing country. So, let us take sample from India. So, you do a contextual enquiry in India, in Indian resource constraint settings and then you come up with certain requirements or problems or needs.

But does that data validate that this same problem also exists, in other developing countries. No, maybe the solution you later bring will not fit for other countries which are also developing in nature. So, it is very important in this particular case that you do contextual enquiry, take data from various geographical regions, various developing countries to collect the individual data for their aspirations for to understand their requirements in order to formulate your design ideas.

The next strategy is investigator triangulation. When a designer or researcher go for a user resource or a contextual enquiry what happens whatever investigation he made he take a note of that, but later when he analyze, he may find that certain problems come across, but it is very important that it should be free from personal biases.

So, a good idea is to work in a team, if multiple researcher or designer involve in a contextual enquiry, then later if those enquiries are compared then we can filter down that information which are common in nature.

So, that way we are doing some kind of peer validation across the outcomes we have gathered. So, investigation investigator triangulation is a good technique to make a contextual enquiry trustworthy. The third strategy is to use theoretical triangulation, this is where theories that exist in literature you use those as a base to validate your findings. For example, if you are trying to identify the Indian buying decisions in 2021, then and the results you may say it may get effected by the corona pandemic.

So, there is a phenomenon that corona and your findings may get influenced by that particular pandemic. So, similarly other theories of human psychology, consumer behaviour that can be placed as a important base tool to validate your findings.

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- **Combine multiple methods of data collection**
  - Observation
  - Interviews
  - Focus group
- **Collect adequate data to reach thematic saturation**
- **Check for Respondent validation**
- **Conduct Expert/ peer review**

The next strategy for trustworthiness can be use of multiple methods for data collection. So, often when you perform contextual enquiry in a new domain, you cannot only rely on only one particular technique or method of contextual enquiry.

For example, if you only rely on your observation then what will happen your observation may get biased with your past experience. However, since it is a new domain you may not have past experience, but still only one source of or one technique of collecting data from the scenario is not going to work. So, you need to rely on other techniques also, you can conduct interviews with experts in that domain you can perform focus group.

So, this way you will later realize that the kind of data that you have gathered after a contextual enquiry process will be much trustworthy then only depending on one particular technique.

The next technique or strategy can be collecting adequate data so that the data you have collected, the outcome that you have collected get a theoretical thematic saturation. So, what do you mean by thematic saturation? So, when we gather information about particular problem or need. So, when we look for problems, we do certain techniques like interview.

So, when you interview one particular person then he may give you certain issues or requirements so you note those down. You conduct another interview and see what kind of new requirements that particular person have give to you. So, then maybe some of those new problems or some of those problems maybe new or maybe repetitive that you already got in the previous interview.

So, slowly when you perform multiple interviews or multiple user study, you will see that particular set of problems that repeats. And after doing a particular number of interviews you realize that no more new problems or requirements are coming from your contextual enquiry.

So, then you realize that you read a saturation where the themes, that the themes of themes means the requirements that has been derived via the contextual enquiry get to reach to a saturation point. So, you are not getting a new requirement, you are not able to gather new inputs. People are giving the same set of requirements every time, then you can stop. So, the idea here to make a contextual enquiry process trustworthy, you need to collect sufficient data so that the inputs you get thematic saturation.

So, for that, one thing you have to remember is that you need to analyze the data parallelly every time you take a new interview or use a new technique for contextual enquiry. Another useful strategy to make a contextual enquiry efficient is respondent validation. So, respondent validation is means that when you identify a particular problem then you later revalidate that particular problem with another user. So, this way it is similar like peer validation, but you are doing it at the user level.

So, often respondent validation is performed after thematic saturation, what we can do is after we reach the thematic saturation we get to know about certain requirements or user needs. And then we actually validate those requirements and needs to a different set of users, to validate does they also agree on this particular set of requirements. So, this way it will confirm that your contextual enquiry is efficient and have gathered good information that is required for your design process.

The last strategy that can be implemented is expert and peer review. So, experts are those people who have been in the field for many years and they have seen these particular scenarios, requirements. Once you collected all your data all your requirements then you can actually do a expert validation to confirm that your findings are valid. So, that is the end of the presentation, hope you have learned how an efficient contextual enquiry can be done and why it is important.

Thank you.