Infrastructure Planning and Management
Design Thinking - Part 2

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Student (Yameni):

So I will be talking on how the design thinking is used in (re deve) urban re development generally urban re development either goes through top down approach or bottom down approach as we can see like top down is we already know the final goal and as already sir discussed is the final goal is the like we already have a final goal and we will break down into smaller chunks, so it is mostly used and controlled by only professional people.

Since it is already the goal is determine it consumes less time comparatively and the government they feel that they have control and efficiency over it while coming to the bottom up approach it is slightly (diff) like it is opposite to the top down approach, here like until now it is like the communities either participated at the start or end like or where the final design is already completed.

Since it is requires interactions with communities it like takes much more time than top down approach, it is generally contents four phases, one is assimilation which means accumulation of information about the problem and it is general study like the study regarding the project and the problems and all development is the development of alternate solutions, communication is (la) final stage where the solutions is given to the client.

So the (bot) design thinking is a part of bottom approach.

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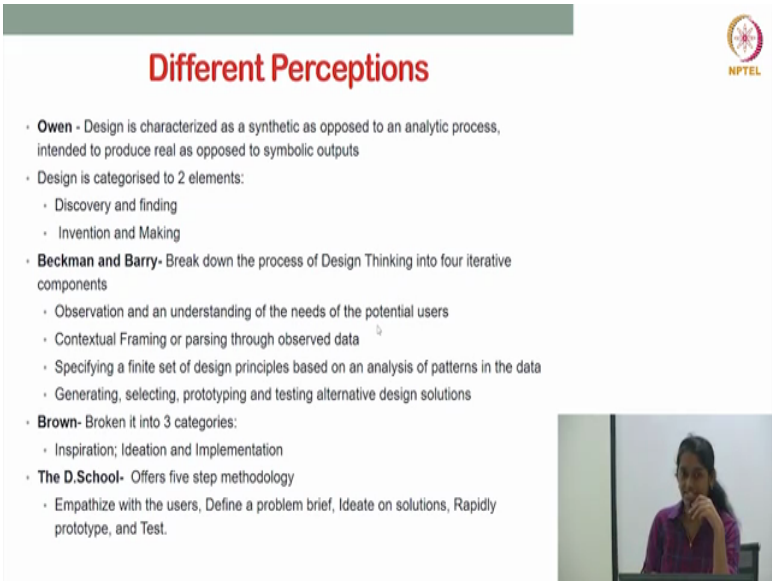

These are like slightly different approaches by different people the one first Owen he categorized design into two elements the one is (de) discovery and finding the first thing that is identifying the problem and like going through insides in the problem and then exchange invention and making and then sense we got another problem, the next part is how to rectify it, how to solved the problem and all.

The other person Beckman and Barry they broke the process of design of design thinking into four components first is observation and understanding needs the that is a primary thing as already mentioned empathizing and all and next is contextual framing or parsing through observed data that it is required parsing, parsing is required to identify the variables, identify which are parameters that can be used for designing and all and since we already analyzed the data which is variables which are needed to be incorporated.

The third one is specifying finite set of principles which should be used and last one is generating selecting prototyping and testing, these are the components given by Beckman and Barry and next is Brown he already he says that the prototyping should be rapid and he broke it into three categories that is inspiration, ideation and implementation as we already saw and the last one is sir already mentioned that the at Stanford university the D school they offers these five step methodology.

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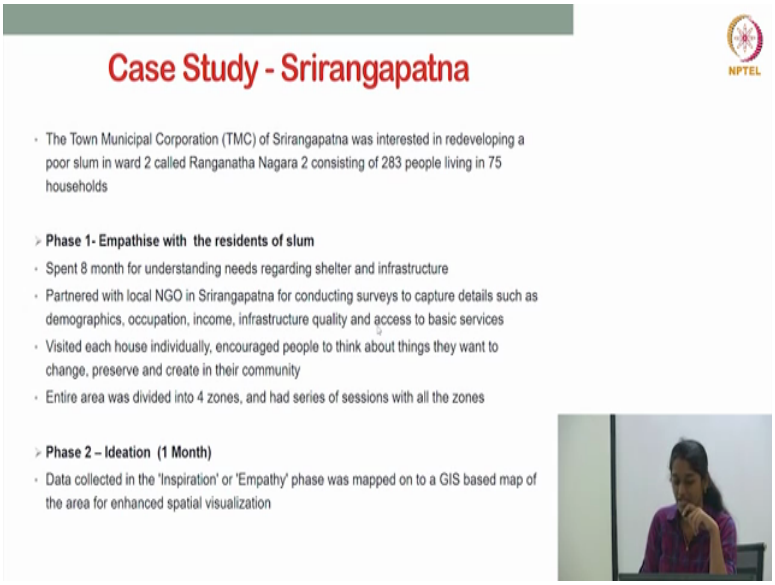

And coming to the application with is his just see the case study of Srirangapatna, the people the town municipal corporation there wants to develop redevelop the slum area called Ranganatha Nagara consisting 283 people and 75 households, so we will (go) the so we are interested in going through phases, each phase and what is done in each phase of the using design thinking.

The first phase is empathysing with the residents of slum as we already saw that the empathysing is very important since it is large infrastructure project like not large but it is a infrastructure project, so they spend nearly 8 months to understand the needs for of like the needs of the people there, their shelter, what are the requirements they need? Infrastructure requirements and all.

They even partner with local Ngo and Srirangapatna they conducted surveys to get the peoples like their occupations, statistical occupation for how much amount of income? And all, how much access to basic services that all the? Or electricity, sanitation all the facilities they conducted surveys using those Ngo is in the first phase they even went to each household to ensure that what to ensure the people that what they are interested in doing, What they are doing, And they even gave some questions to the people regarding like each question each household per people where as 3 questions like what they want to preserve in their community? What they want to change in their community? And what they want to create extra (())(05:24) their community?

They consulted these like these 3 questions were as in each all the household people and they came like they gave so many answers and they were they even spoke with their separated apart from all this again they spoke, they categories people into four zones and (whe) like it is like so many sessions with them to identify and the people they showed some interest in showing that what can be possible and what cannot be possible from the ideas also and after this 8 months since they gotten off all the what are the basic needs and how the it should be gone? How the planning should be done?

So the next phase is ideation phase, so the data collected in empathysing phase they used it to for visualization.

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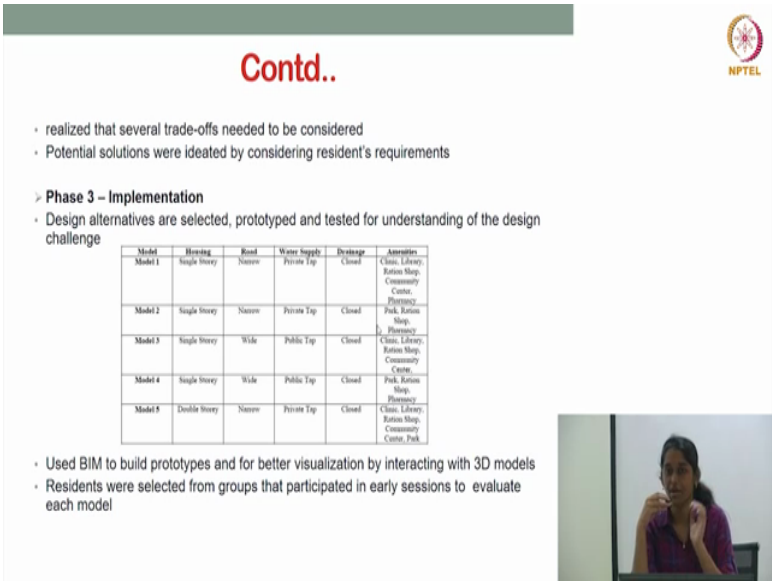

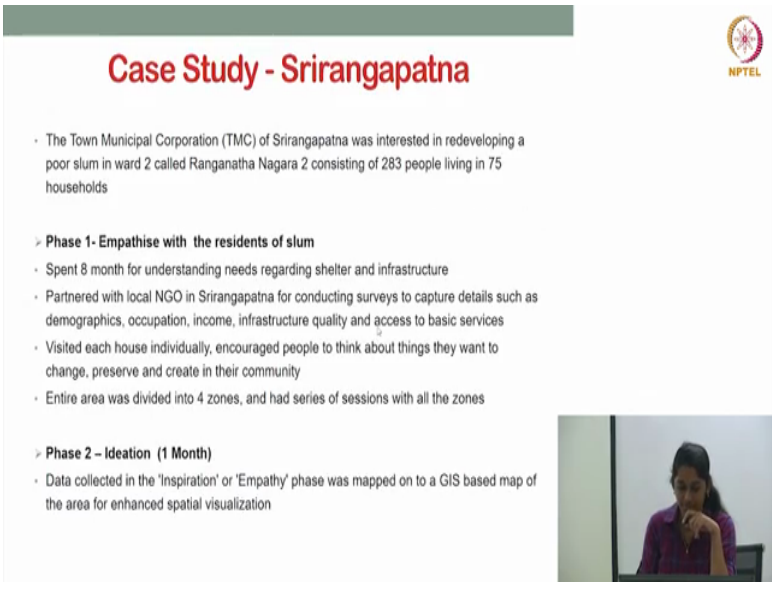

They thought in order to meet all the it is in order to meet all those needs it is really difficult, so they thought some trade off should be done such as if they want some prime water tabs they should like they should give upon large widen roads like some trade off should be there and after all this considerations they came up with some potential solutions considering all the residents requirements.

After this, the third stage is implementation, in this phase the designs alternatives which they done in the previous ideation phase they selected prototype and tested like through interactions with people in the slum area, like these were the 5 models all the models all the prototypes which can be there used there in the area they even used this BIM building information modeling to like all the prototype 3 (mod) 3D models interact with 3D models because in this it is (usy) easy to change the deliverables in the and change the like they the people over there they had sessions with people over there in order to see how the viewing of how the requirements they proposed all that can be done in this, all are done with this and they have all these models were evaluated by the people like some specific groups from the within the people itself.

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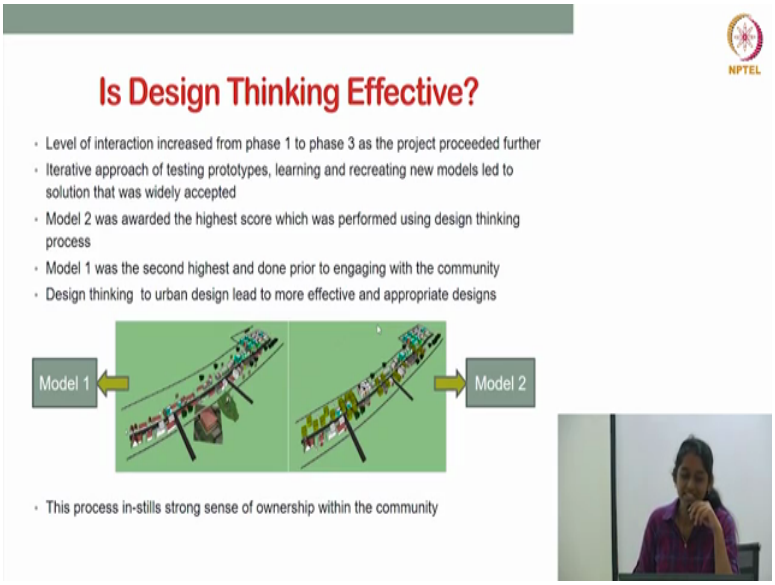

And after all this the main thing is the design thinking effective here? We can say yes since because the level of interaction increased like drastically from phase 1 to phase 3 since because in the first phase people are very it interested much and use it to very come very late to all the sessions conducted but later once the 3D visualizations were there and where people can sit and watch all the visualizations or models, peoples were much interested in use it to come on time and use it to interact much with and they use it to like inform them that this

cannot be done, this they wants this these changes and all from by the community people itself.

So we can say level of interaction increased and due to many iterations and many scorings of the people given by the people they recreated models that was widely accepted and we can see here two models, the first model is then after design thinking and all and that previous model one is without before doing design thinking, the highest score was given to the model two but like least score was second score highest scorers given to model one maybe that might be because of lack of belief in people that they actually might do the project but the first project the first model was given the highest (prior) highest score.

Design thinking to urban design let to more appropriate design, so apart from all this the community failed much more on like higher ownership in the project comparatively, so I think design thinking here in this case became effective, thank you.

Professor:

So I am not, so your question is you know as the number of iterations go on the cost of design will increase, so I am not necessarily sure the that is the case because essentially what we are saying is we are saying look you going to spend 6 months on design anyway but instead of 6 months locking yourself in just comeback with these prototype over resource, so the total manner was we expect people to spend on design will probably be a little bit larger, right because of the amount of work that been given to slum to the idea is it is not order of magnitude larger necessarily it is just that you are working smarter.

And the second point is therefore you are actually saving cost letter when after you put concrete in the ground there are changes that are made because it is obviously easier to make changes on paper than to over there, so ideally the idea is that you should get a cause benefit advantage out of doing this all though I take your point that pure design cost are likely to be a little bit higher may not I am not quite convinces order of magnitude higher but that is something to debate the discuss.

You cannot really satisfy everybody just like same the shopping cart there might be somebody who would not have sort of particular combination of goods bought may not affected to that shopping cart, so I do not think you can do this universal design, right that becomes very difficult but the true so essentially I may will come to both you guys you know

second but essentially what is happens here is an example of doing this doing design thinking in infrastructure setting here it is housing, right.

So essentially saying let us spend on a lot of time these peoples understand what they want and then decide the community, there is a lot of interaction that people do with stakeholders, right but very often that does not necessarily translated to design those are often two separate steps engineers do the design, Ngo is do the a stakeholder consultation to make sure the that they get the right compensation and so on, right.

But here we are saying take input for one put it into other and show them prototypes and that becomes a little bit of a you know challenge in our industry, right I mean in our sort of world because yeah I can fabricate a shopping part very quickly but how do I fabricate a house? Right or you know more importantly how do I fabricate a township, right it just not that easy, ok and of course architects for a long period of time you would have seen you know they come up with the small scale models etcetera and those are good but they do not quite give you the feel but that is where you know things like all the digital technologies that are evolving building information modeling etcetera start becoming useful you can now build these 3 dimensional models, you can actually now show them you do not need even half to show them on a small screen you can project them at scale on a big screen you can actually have people do walk through is, ok.

There is this company called Trimble and one of their offices is just outside IIT madras and they have come up with an interesting project some of you have labeled with code hololens, right essentially they have a hard hat they have got a camera fixed on it, it sort one of those augmented reality, virtual reality kind of technologies where this building that is being design can be projected through those glasses, right so you actually feel like you are standing in the middle of this building although it is completely virtual and you can start looking at the services, you can start looking at clearances etcetera and you can start making decisions and it is very easy for me to alter things, right I just have a model I change a few things I ported back onto your device.

So with the power of augmented reality, virtual reality building information modeling etcetera without pouring any concrete we can actually start creating life like images and renditions of infrastructure that people can somewhat experience give feedback, right so one of the feedback that we got is people (wh) talk to people they tell you all kinds of things but when they see it is see look street lights, right are very important and you guys have not given

enough priority to it, we did not given up priority because that was not part of the initial data that came up but now they did it they came up, right.

It is far more acceptable design and here to your point, the point is that it is not so much that everyone love the design, right but because it went through this kind of democratic process, right and a lot of people needs were met and people understood that this was represented as what people wanted, there was more ownership of the design which is what you really want, right you want people to sort of own the projects so that they do not act against the project, right.

So design thinking sometimes it is not only helps you arrive at an optimal designs solution also helps you arrive at an optimal ownership sentiment that allows the project to take place and this is probably worth that extra design cost that you might spent, right another example where this worked not exactly this process because we were thinking of design thinking then many years ago when the tsunami hit the coast and late 2004 I came back to IIT in 2006 and one of the first thing that our department was doing helping rebuilds some of those community, right.

So to the extent to which we could prototype that and I think might have been the first beam model built in India whatever but I built a very small 3D beam model and of 4D model of how these house would come up and showed it to some of those fishing communities there inculcated a lot of ownership, right so people saying ok, now we sort of understand how this process worked, what it looks like you know can we have these kinds of changes made.

So I think the it is not only coming up with the optimal designs which also inculcating that ownership, right which is where design thinking is relevant and as you can see it can be apply to infrastructure may be not all kinds of infrastructure but certainly certain kind. So ok so you are talking so that is a that is always a tradeoff, right I have a fixed amount of funding based on which this is what I can do, right but within those constraints there are number of potential design solution, right.

In every potential design solution within a constraint I will have to give upon something, ok so either I have really I mean I can only buy I have only the money to buy a 1000 square feet apartment, so if I want to have a large hall I have to give upon the kitchen and the bedroom, right if I want to have large if I want to have study and the bedroom then I have to give upon whatever.

So there are always thinks that you tradeoff on, now the question the thing behind the design thinking process is possibly it will help you identify what the optimal tradeoff for that customer would be, right travel then so there are always be tradeoff for what is the optimal tradeoff is the question and similarly even of you release that constraint and you day ok you got more money you can do 2000 square feet, 2000 square feet still a constraint, right there are still you know things that I could want a larger you know home theatre, right within my apartment and that might still not be possible.

So there will always be constraints that you design under what design thinking does it raise to understand within those constraints what is the best possible design that can you now that can meet your needs, right so again if you look at the shopping cart one of the constraints was it cannot cost more than the existing shopping cart and the existing shopping cart is you guys have seen I am sure you have been in the supermarket are very simple they must cost very little, right so therefore my price point is still very low yet I have to design more features and therefore I cannot design everything I want to design.

So what are the things that I reality need to design then come out of that kind of a process, ok always confuse, yeah are there.

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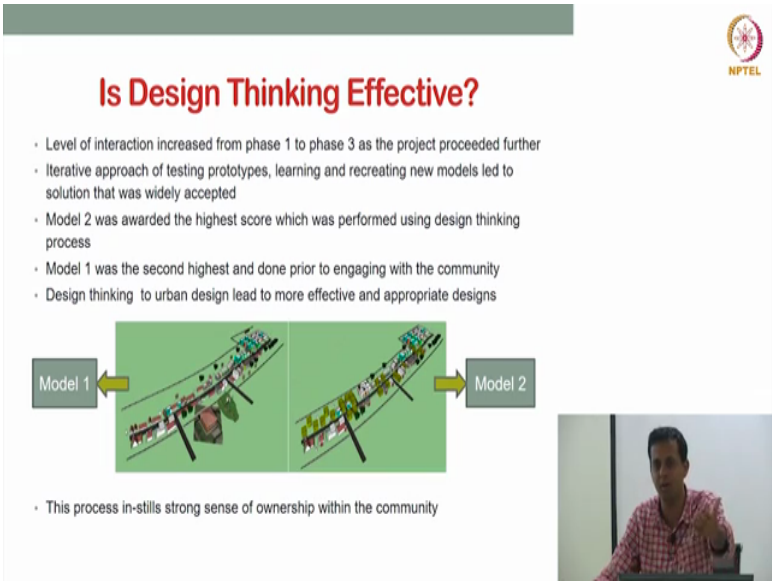

So yeah in this is and I think Yameni was sort of making this point, so the point that Arvind is making is that see model I cannot, so one of these was the which came out of the design thinking process was the top model then there was this other model that came out as number 2 which was actually the model that was built before the design thinking process, so in order

to do this experiment what we ended up doing was without doing any design thinking let us model just the way typical architect or engineer would do.

Let us keep that aside then let us go through the design thinking process and model and so we can actually compare, see if the design thinking models are better than the non-design thinking one, so on the one hand yes, one design thinking model was better but the non-design thinking model did quite well, right remarkably well in fact and therefore that you know ask the question are you wasting your time on these design thinking even the non-design thinking thing actually does well.

In this is where we went talk to people and it is very difficult to sort of establish this but the answer that we got were we picked that model because it is looks like the standard stuff that gets done and therefore we believe that this will get done, right whereas your model are certainly much better but we do not believe that the government has the capability or the inclination to do all of the things, we believe that they will do that anyway and therefore we are picking it because since we know that is going to be the outcome we might as well pick it rather than this is what we want, ok.

So if you sort of so that seem to be the psychological sentiment that people are actually like the design thinking models better they were far different from the non-design thinking one but you know given the way these things happen people are reconcile to the fact that seem to be reconcile to the fact that this is what I will get, ok so that was the reason. So, ok so great question.

So Partik says look Steve Jobs is a great designer and he is gone on records saying people do not know what they want, right so is not the sort of the proponent of the anti-design thinking lobby and because Apple is done so well should be go in that direction, I am actually going to argue that Steve Jobs was a big proponent of the design thinking philosophy, right and so let me just show you one set of exercise, ok I will show you the exercise I wanted us to do, you guys can do with friends if you like.

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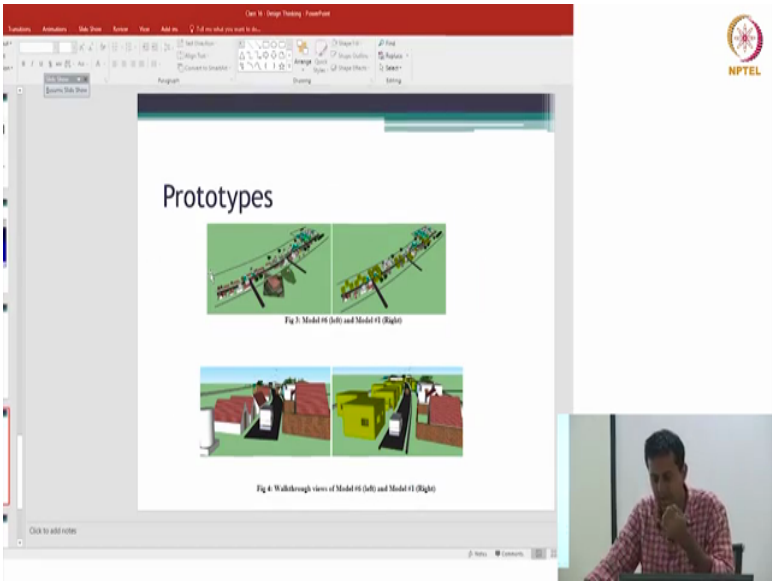

Ok, so anyway let us comeback to the Steve Jobs question, ok so the exercise that we are going to do and I will use this to answer the question, I wanted you guys to design pair up and design something for each other, right.

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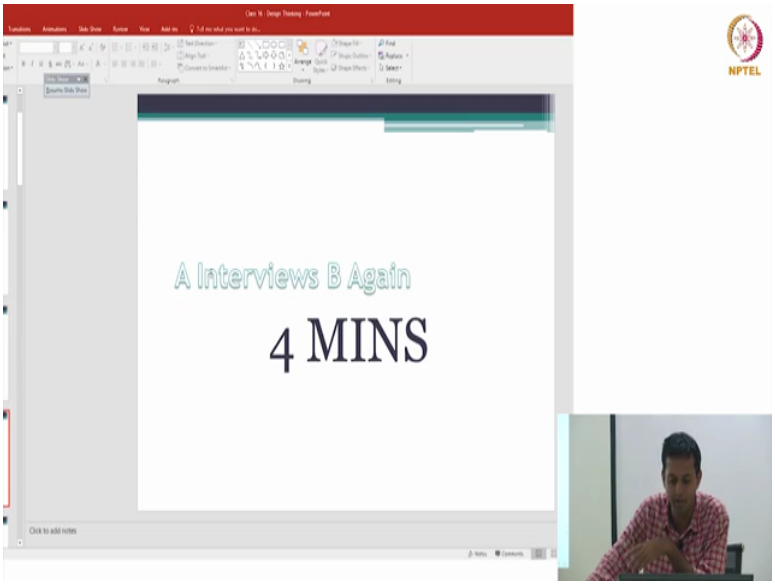

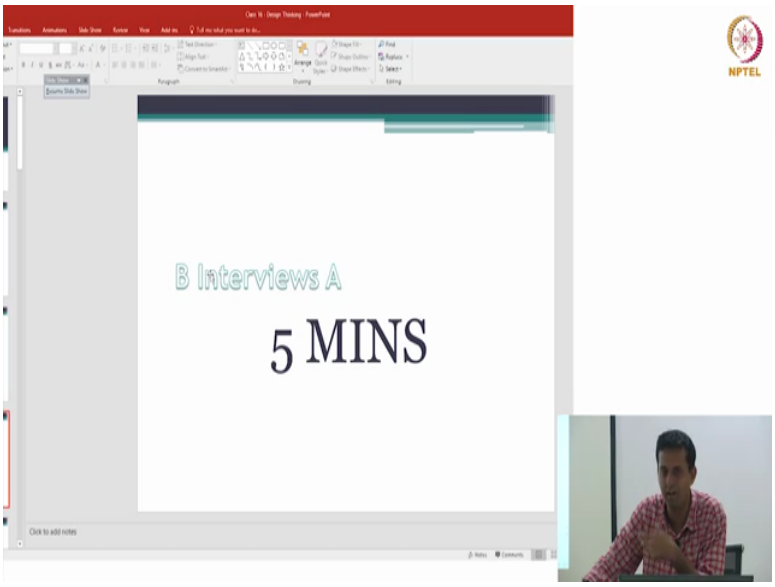

So very often in this kind of a class we do small things we do like wallets and purses and whatever and this would have been the exercise, right you would have been in pairs one of you would have been A, one of you would have been B and had of B interview A for 5 minutes, A interviews B or what sorry A interviews B for 5 minutes, B interviews A for 5 minutes and then I let you have another round of interviews again and you guys can try it out in the hostel if you like if you interested to see how it works.

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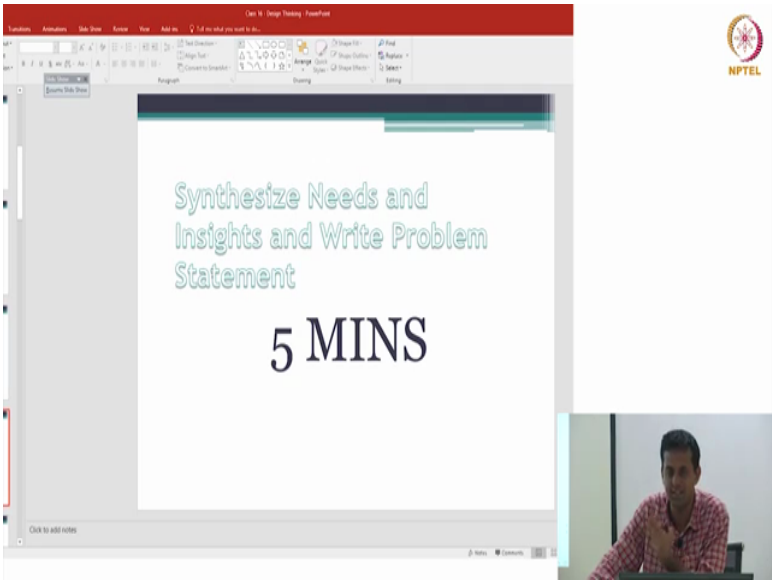

So couple of rounds of interviews and then you know basically synthesis what you have heard and you write a problems statement.

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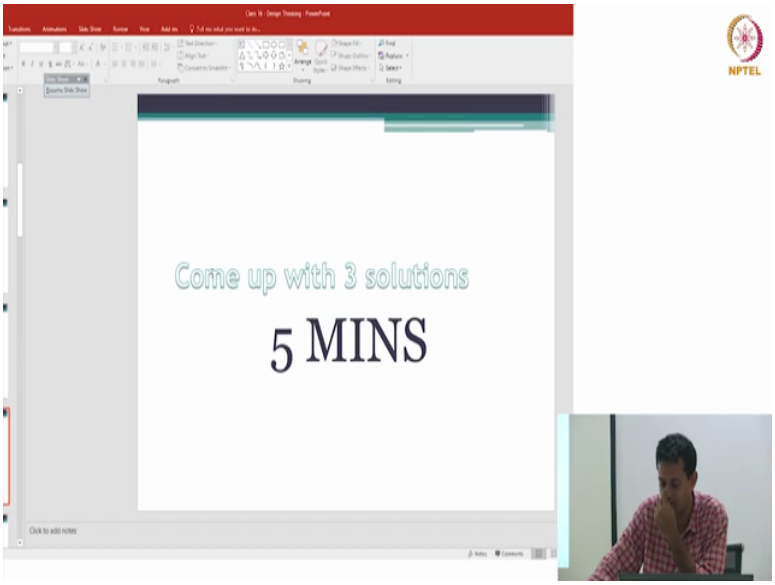

Based on which you come up with a few solutions because remember you need to prototype, right.

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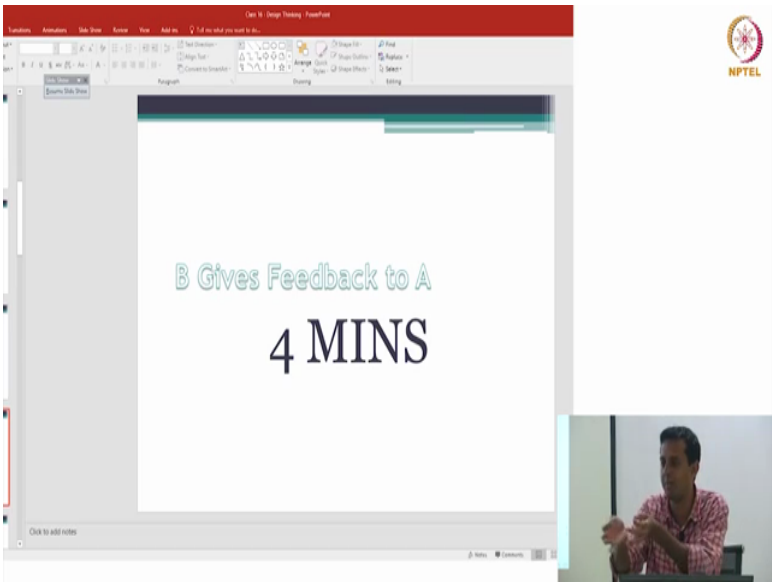

So it is not just one, you present those solutions and then those solutions can be a very short, right it is in the past people have written, people have drawn, people have tone out pieces of paper and fold they them interesting ways and shown, right so you can sort of be as creative as possible with whatever materials you have.

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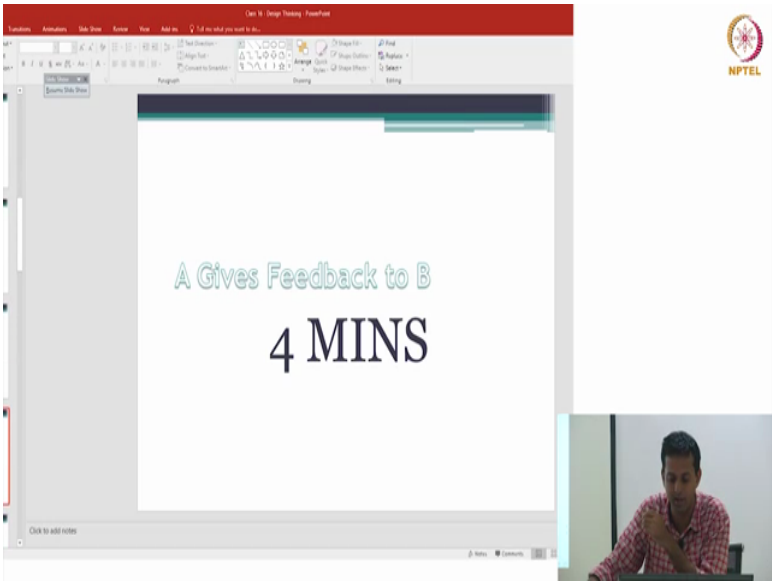

Feedback is given.

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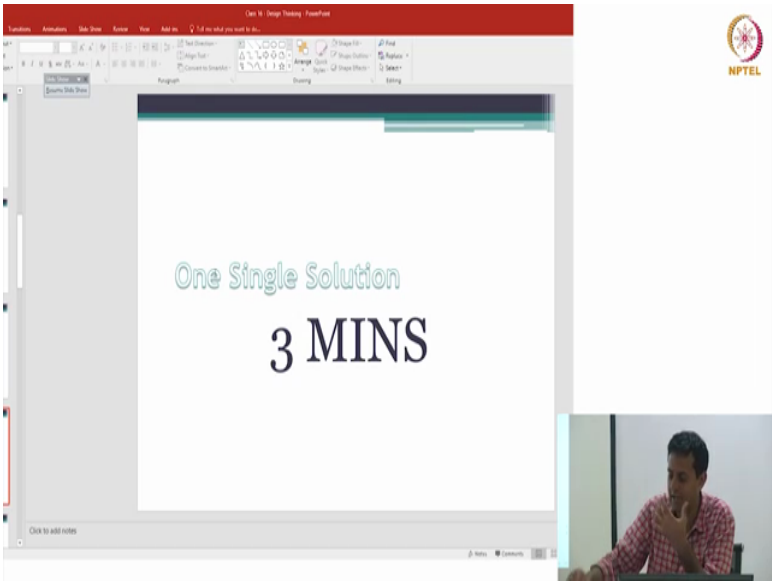

And then you sort of like at the shopping cart example put things together into one solution.

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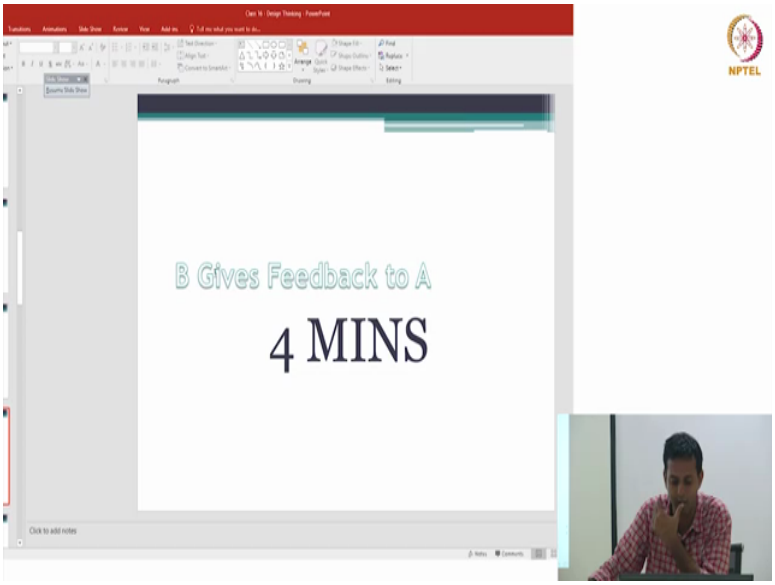

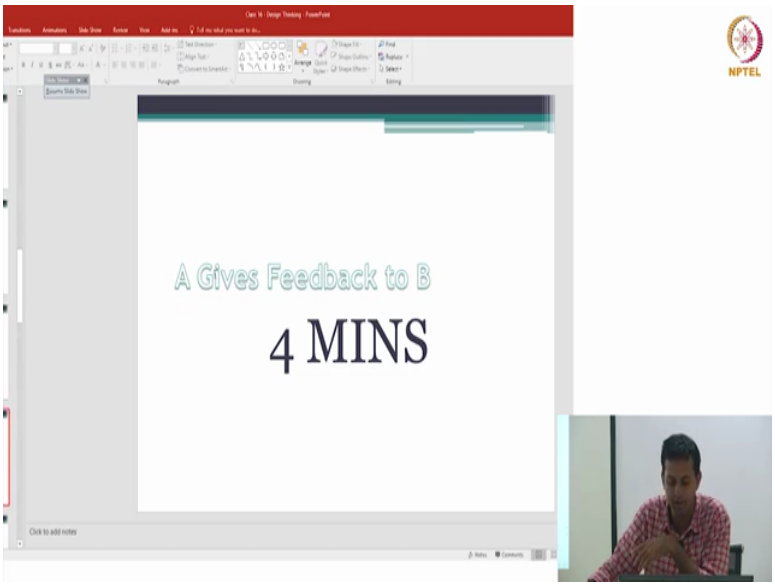

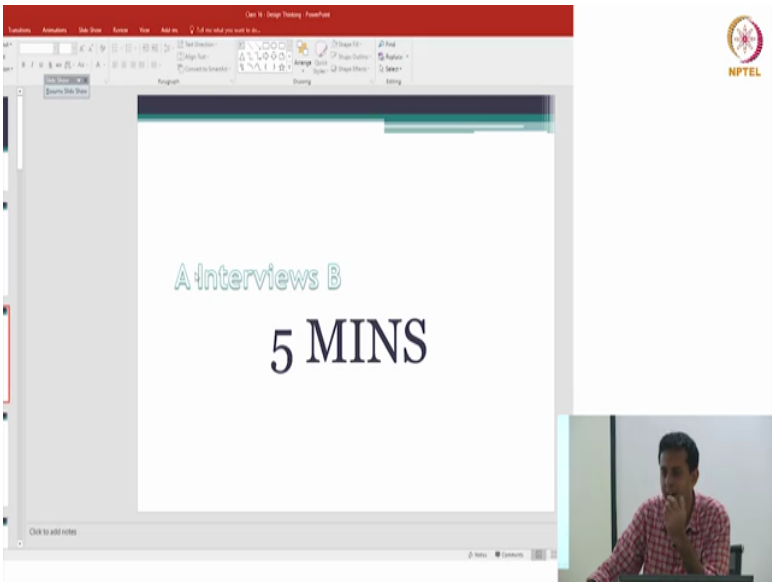

Little bit more feedback is given and hopefully finally you are left with something that you like and you own etcetera as you can see it takes about 40 minutes to do so and we have less than 4 minutes but the reason these answers Parthiv is question is when you go back right to the beginning and say look I need to figure out what A wants, right or B wants.

The most direct way of doing it is go and ask them, ok but very often exactly Steve Jobs says people do not what they want, so while in a classroom exercise I do not have any other option but to give you guys 5 minutes to talk to others, in a real world scenario it you were designing a wallet for somebody you are actually would not ask them very much, right you would actually follow them around, right and try to understand what their requirements are because they completely agree that you do not you can articulate, right but that does not mean the Steve Jobs said I know exactly what people want, right he and his team did a lot of study and understanding in terms of how people behave, right.

So I will give you a simple example, right so you come and sort of follow me around for a day and you find the right travel quite a bit, right you also find that I travel on bus quite a bit, right because you know I have many meetings all over and I tend to take the bus etcetera from that gives you a little bit of a clue on what kind of a wallet you might need to design for me for instance of a first of all or purse or whatever it is if I travel a lot it is likely then I am going to have carry a lot, right because I am not sort of in one place where I have storage space, ok so that gives you an idea.

If I am going on you know a bus or whatever and I am going to be sitting in a seat with a huge fat wallet full of a material it is going to be uncomfortable, right. So now you start thinking of potential solution, what are the solutions? There are many may be it is a belt pouch, maybe there are many other solutions but because you understand how I behave you start coming up with ideas if you asked me what kind of wallet you would like? I do not know, right I never thought of I did not want to wallet, right if I wanted one I just go and figure out the nicest one in the shop, I have not really thought about it.

So if you ask me what kind of house would you like? What kind of wallet would you like? What kind of computer would you like? What kind of bridge would you like? We do not know, right so you do not follow the direct approach the approach you follow is essentially what I was talking about here which is ethnographic, right.

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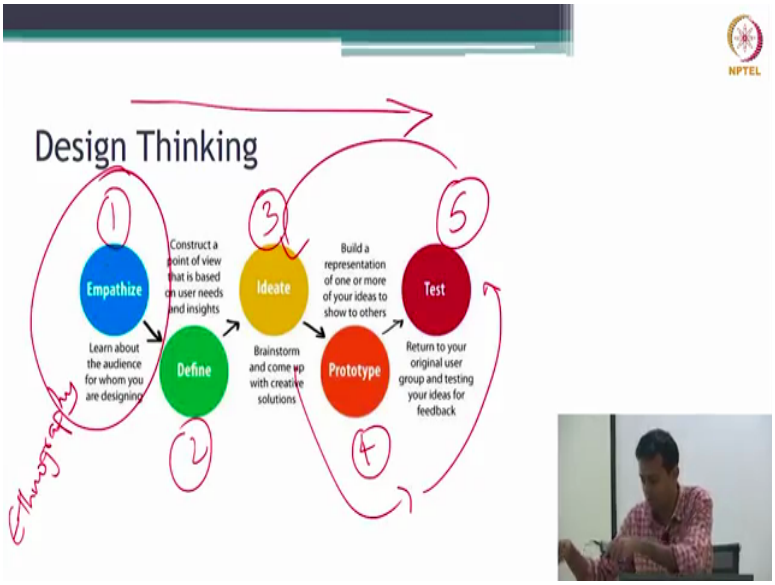

So this word here which is you study people and this is the exactly what I believe Steve Jobs is a master act, right that without necessarily just taking feedback input from people he had a very good pulse of what people like and that is the fine Apple for decades, right they really understood what need you know customers happy and they for all of the products whether it is the iPhone or the iPad or the iMac or whatever the mouse, right.

Even the first graphical user interface because they were the first one to comes out of the graphical user you know interface in terms of the operating system etcetera, right was because they sort of understood something about the consumer before other people understood without asking people what kind of operating system would you like in 1970, right or whenever when people did even know what operating system, what computer right all I have some people new about punch cards, we cannot ask people about things that they do not necessarily know, right.

So I think that answers the question on it is not so easy to empathize, to do an ethnography and lot of it is not just tell me what your requirements are lot of it is following people around understanding that is why people went to the store I mean everyone goes to store, I do not need to go to store to interview shoppers, right I can just interview people in the next building because everyone shops, right why do I need to go to the store, I need to go there to observe, right and need to observe what people are doing, right where are they getting stuck, right what kinds are they sort of food are they buying, right.

At therefore you come with categories of shoppers, right shoppers with children, shoppers with there you know the professional shoppers as they called them, right etcetera which you could never get by asking people imagine asking somebody what are the categories of shoppers that you find when you go to the store, I do not know all I do when I go to the store is (ip) asked the fellow where the milk is or where the you know bread is or whatever it is I am going to buy, ok.

So yeah so just because of Steve Jobs said that does not mean is anti-design thinking my view is pro design think it is generally gets it and when gets it you have got empathize by observing people and he and of course he had also some insights, right so he had intuition that not everyone might have, so it is not that he spend time going around, right. I mean interesting thought of I will leave you at this because I think we are more or less out of time and I give and say this sometimes that I gives talk on (())(23:49), what do you think a CEO is in Silicon Valley not all of them but some amount of them are doing over the weekends?

Partiv I think Partik I think knows this, right if you do not that means you not have listen to enough my (())(24:01) talks, ok what do you think people are doing over a weekends? CEO is of startup company is in Silicon Valley, so there is a big group of them.

Student is answering:

Observing people.

Observing people how? Right, That is the answer but there is sort of mechanism in between, right so when I was there couple of years ago I talking to people I do not have statistical data to back any of this, right but a good number of CEO is in Silicon Valley on weekends are driving uber, right why they are driving uber, right ok maybe they make a little bit of money I mean once met a relatively reach guy who uber me because he said this is my golf money, right so maybe there are few of those but primarily it is because they get to meet customers, right and they get to talk to customers of course they are not going to ask them hey I have this kind of a website, right would you like to come on in, right because then that is probably guarantee to give you 3 star rating or 2 star rating or whatever, right.

But obviously they are to understand the pulse of customers even if all kinds of customers, right you will have businessmen, you will have athletes, you will have you know I do not know state home parents whatever and you actually start talking to them and figuring thems you know figuring out what works what does not which you can probably add on to your

products but basically it is consumer facing product if it is a nap or website or you know some kind of consumer good etcetera, right.

So not of it is not about just asking questions not if it is about observing, right being an uber driver for instance of course in India it is difficult because the with various reasons it is difficult for us even if he wanted to become an uber driver but yeah I mean in the US it think about it, right CEO is driving uber exactly because they sort of buy into this kind of the need for ethnography without design, they not sort of saying we know exactly what you guys want, right all I need to do is harness the power of machine learning, artificial intelligence, natural language processing or whatever the birds who are today and come up with a product that will solve all you r problems it is exactly the opposite, ok.

So design thinking to me is it is has nothing it is not exclusive for infrastructure, right in fact I think it is something that you know I guess if you are involved in Saarang shastra CA fest whatever it is, I think you should think about using design thinking approaches, right for all of this, right but I think it is also particularly important of the case of infrastructure because you can actually use this as a way to engaged with stakeholders, you know get them to feel comfortable about the process possibly come up with the good design but also reduce resistance that you might face going forward and that maybe away in which we can design projects that do not meet the faith of a Bujagali or I mean just think about how life might have turned out differently if Enron had used a design thinking approach for the Dabhol power plant, right what might have happened there.