Infrastructure Planning and Management
Design Thinking - Part 1

So today again we are talking about something that is relevant to managing stakeholders but taking a slightly different approach, so we talked about we know stakeholders are important because the case studies have showed us that, we have talked about how to identify them and yesterday we talked a little bit about how to negotiate with them but sort of a parallel not mutually exclusive but complementary approach is also this notion of something called design thinking which I think is very important to both designing projects as well as managing stakeholders.

So what we are going to do in the class today is talk a little bit about design thinking again what I would like to do is sort of do some you will have some presentations to make we will discuss I will show you a short video that we can all watch for about half the class and then the second half again we will pair up like yesterday and you guys can actually do a live design thinking exercise ok, all right.

So we will start off with group one I think we are cycling back now right, so group one Sudeep you are going to do this ok, now Sudeep are you going to present both the readings ok, do the first one who is presenting the second one ok, so after the first one we will come back and have a discussion and then so you are presenting the Srirangapatna case study, so yeah so come and present yours and then we will discuss and then I will have you come in.

Student (Sudeep):

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Hi everyone today I am going to present on topic design thinking for social innovation, this is part of a review paper presented by the Stanford students.

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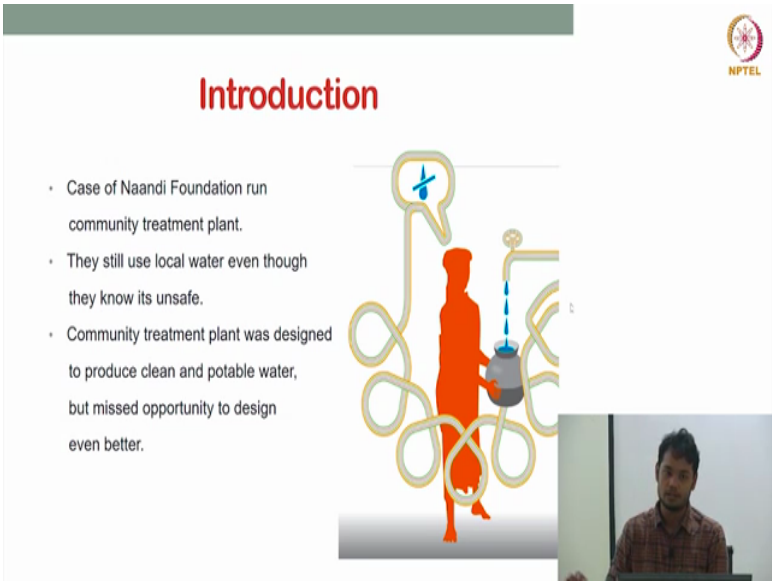

First in this they are going to talk on the case of Naandi foundation run community treatment plant which is near Hyderabad Indian village, first I talk of an woman there is she carries an water from the near local water, she is capable of carrying three gallons of water on her head but there is Naandi foundation which is supplying water cans of five gallons of water even though she knows that the water from the local supply is an unsafe she still takes that water itself.

The basic reasons for this her five gallons of water cannot be carried by her even though if she can carry the design of that can is rectangular shape and it is not suitable for carrying and all and the cost of the water supplied is about 10 rupees and for them it is still an privileged to pay 10 rupees for each can and for this the Naandi Foundation was able to design the plant of cleaning and all to supply the portable water but still they have missed the opportunity of gaining the customers like these people who are not buying this water.

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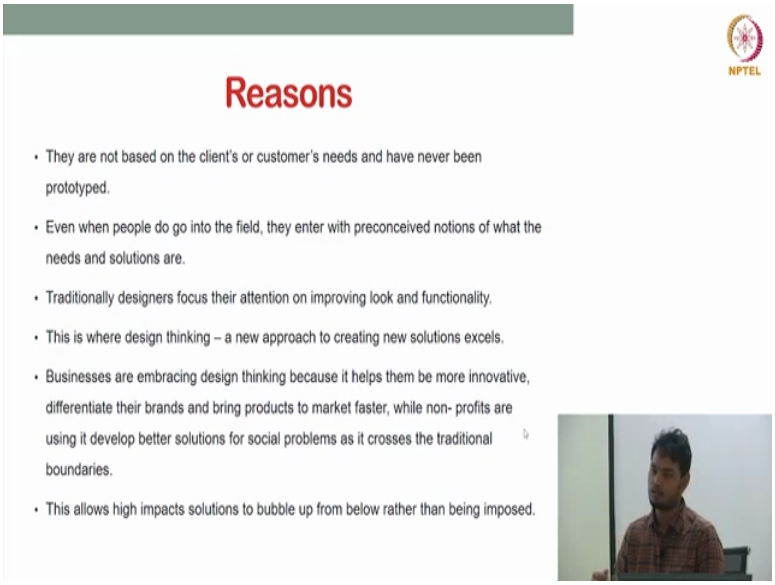

The main reasons can be considered as the customers are not involved in this design process or else like they did not ask the clients what needs what are the needs of the clients? If they have incorporated the needs of the clients they could have addressed this problem and even if the people from the foundation if they have gone to the field and they have took the opinions of the clients and all they cannot address this because they are already fixed their minds like this is what the needs of the people and these this is the particular solution for this problem.

So traditional methods cannot solve this type of problems for this there is a new approach called design thinking approach, design thinking has been used in some companies as well right now like Apple products and all they are using design thinking they are get an collection of reviews and all from the people they will incorporate into the design by using all these reviews from the people the products can be innovative and they will their brand will be different from the other brands where other brands cannot be able to provide what the needs of the people are, this is basically like incorporating the people is needs and providing what they want.

So we are getting an high impact solution from the bottom rather than getting impressed by the higher authorities like they are planning what the solution is and giving that solution to the people.

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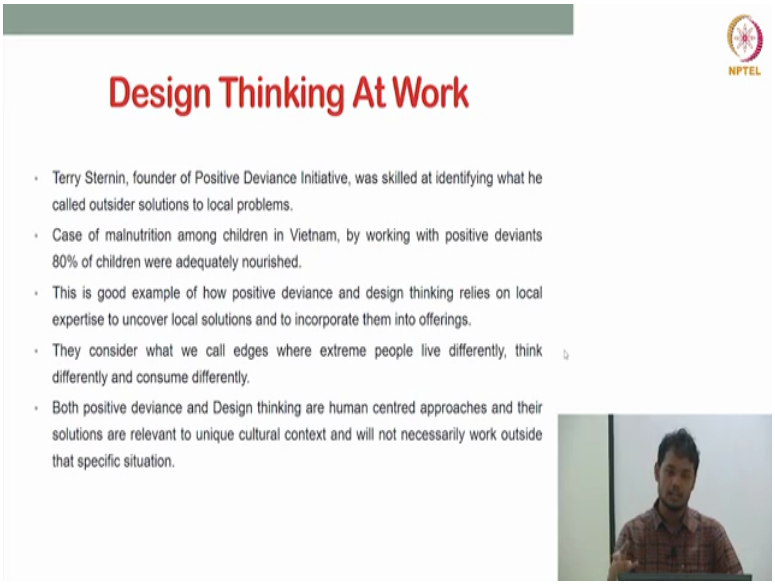

Like design thinking at work here there is an Terry Sternin who is an professor he is an founder of positive deviance, here there is an example of malnutrition in Vietnam, he has all this within small it is like there are people in this Vietnam State like more than 40 percent of the children are affected by the malnutrition there they is below 5 and from this they have gone to the place in Vietnam and asked the people who all are affected and all and from that they have found some 4 or 5 groups of people who are not affected.

It is a positive deviance from the other it is like remaining all are affected and these are not affected, so they want to study on them why they are not why these children are good and what is the nutrition they are following or not from this they are known that they are even having crafts and all they are keeving they are giving the children these crafts and all food, so they are getting direction and all something is happening and finally they are getting the problem.

So this one they have incorporated into the other people as well other people also follow this same principle and all by this implementation 80 percent of the children were recover from the malnutrition within 2 years, so from this what this professor calls this as like these 4 set on these 4 people in that community are different from this, it is like how they behave and all are different from the how the remaining community behaves and this is called as positive deviance.

It is like there might be some people with negative deviance also but we have to take the positive thing and which will be helpful for the people and that one if we can incorporate into

this and we can provide an better solution for the peoples rather than having some medicines for nutrition and all that cannot solve this conquer this problem can be solved by cheaper cost and all.

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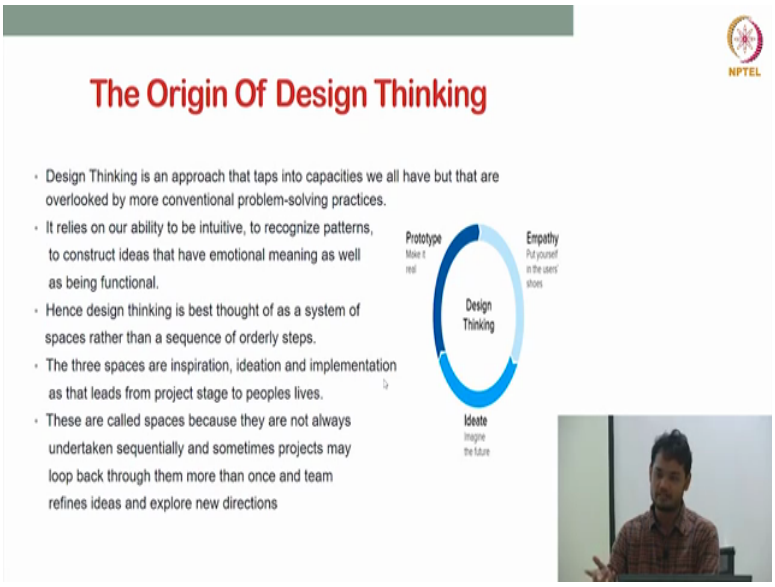

Next origin of design thinking even there is another example like this problem can be as I already said that people centered approach this is an people centered approach like we are incorporating the how the people are reacting to a specific problem and the positive deviance part of it, here the solution might not be applicable to the entire world but it can solve the specific situation.

Since there is an example here like in Africa there is an malaria, malaria has been growing largely and they have done in research and finally they have got in to the hospitals and Hospital supplied nets for free and finally they are kept even one thing like only for children or mother who is pregnant they are supplying this thing and finally these people are children the (affectio) affect rate of malaria in these people has decreased but for old people are getting affected when they see in the causes like a old people are not getting these nets for free of cost and rather these other shops are not selling this because many people are getting at free of cost, so if I supply my business go at loss.

So only specific problem that (peop) children are not getting affected by malaria has been solved but not the complete community problem has not been solved. Next coming to design thinking approach in this there are three spaces we will call them as spaces rather than steps because they can be of iterative order or else they cannot be in a linear fashion we can do it in

first we can have an idea of it can go and see if it can be implemented or we can get an problem from other where if you have not some idea where we can implement that problem and all.

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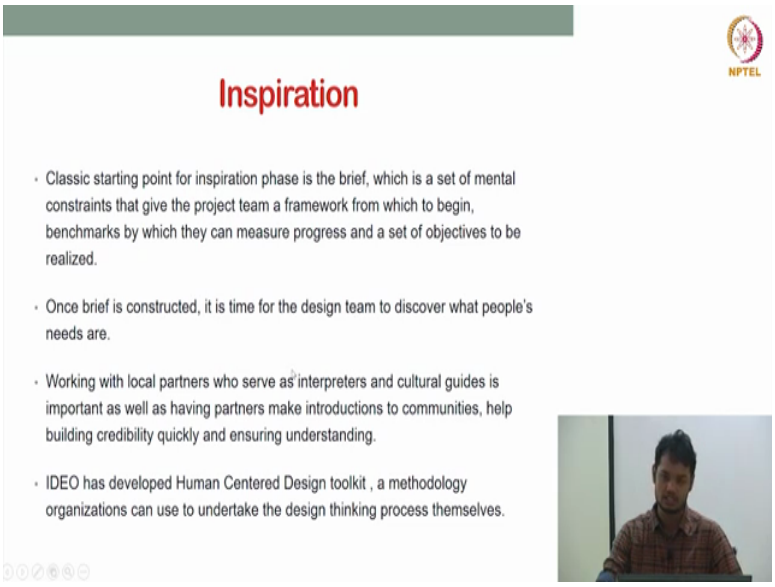

Next inspiration, classic point at starting it is like brief we will be having an idea of what the problems in the complexity and we will take an problem from that and we will try to solve that problem. First when we have and complete set of the problem later we will have an approach how to solve this problem and all we will ask our clients or people in our company to come with an ideas and all.

If we have many ideas from that we can check which can be feasible or not and finally there is an idea which is an human centered design toolkit which is available on websites on our, which can help individuals to take a design thinking process easy.

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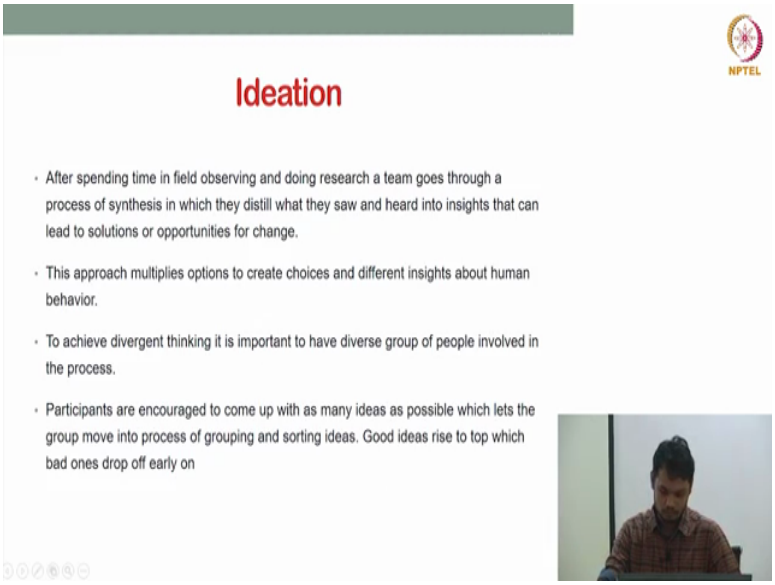

Ideation is like after spending a lot of time in designing process and selecting a specific idea we have to implement that idea further turned all we have to design steps and all what steps we have to take to implement this idea and all, this can be done in the ideation part for this way as I already said that we needed diverse group of people like some people from law, some people from designing architect and all, so that they can come up with a different ideas and we can have we can discuss what problems will be there on different approaches from different people and finally the best idea will be selected among all this and that can be implemented.

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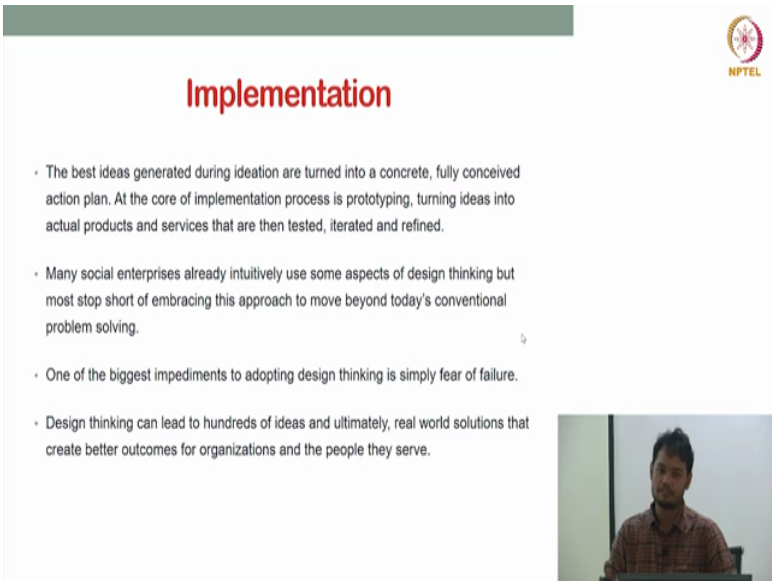

Implementation stage it is an important stage as we can get new challenges we will face new challenges while we are implementing this problem like I already said in Africa states like only people are children malaria rate in children has been decreased but for adults and all it has not been decreased like only some specific problems might be solved in that, so we have to reconstruct the designing part after the implement implementation stage as well.

Many social enterprises are already using these methods for designing as I already said Apple has been using this method but many people are fearing to use this method because they might get into loses, this is not an conventional approach this is an some different approach from conventional thinking method and conventional designing process, finally we will you will be able to solve this problem by design thinking as well but we have to overcome fear.

Professor:

Ok, thanks so Sudeep has a lot of information on design thinking but I want to sort of just start off with a very simple question right, so a design thinking is essentially a process of design right and one thing we need to understand is when we think about design since most of us in this class at least are engineers Alexander you are an engineer? Ok, so all of us are engineers we tend to think of designing physical things like civil engineers design bridges, mechanical engineers design automobiles all of those kinds of things but design can also apply to a process right, so if you take something like Swachh Bharat ok, it still has to be designed as a as a process ok, so or Sarang or Shastra or similar to see a fest or whatever it is you want, right.

So now the question is we have been designing things for a long period of time and we now have this new paradigm called design thinking ok so what is design thinking about? why is it any different from I mean you guys many of you have taken classes in design right even in the last few years in the civil engineering department right so what are we talking about that so how does conventional design work and what is new about design thinking.

So essentially I think if you look at the process of design and most of you have gone through some kind of a design class right so you have designed concrete beams and you know whatever so if you look back at the process right first you are given some inputs so typically in the civil engineering case you are given some loading conditions right so this is I mean this is a you know this is a bridge this is the kind of traffic that is going to go on this bridge and

so you have some idea of live loads, dead loads etcetera earthquake loads wind loads whatever so I give you some data, ok.

What do you then do with that data, you take that data and you then do all of these complex calculations ok and you come up with a design for whatever it is beam, column, bridge whatever right and the design of course many components if you are designing one member then it is very simple right, so what are the dimensions of that member is there any reinforcement whatever if you are designing a whole bridge there are many sub aspects to that design right but then you come up and what is the expectation? Right, is the expectation that this is an implementable design or is the expectation that this is you know just a prototype or just a trial when you do when you done designs right and you come up with an answer it could be in your structural analysis class right or you know concrete design class when you come up in the with an answer is the expectation that this is the right answer or is the expectation that this is a trial solution.

Student asking question: (())(14:13).

What is your expectation when you are designing it, so if you let us say I am the client right, so you are designing it and you come up with this calculation do you expect me to say find, good I mean of course let us say somebody checks your calculations in your calculations are fine do I expect do you expect people to say ok, yes good let us go to the next stage or do you expect people to say interesting go back and try out another iteration what is the expectation?

So the expectation is that you have solved the design problem right the expectation you may not have you made have my may made a mistakes etcetera but what you are trying to achieve is the perfect solution first up right so I am giving you conditions you are thinking through you have the engineering knowledge to design you are expecting to come up with the perfect solution or a near perfect solution right.

In an ideal world your solution will be acceptable right and if it is not acceptable then it is (probe) in your mind it is possibly because you have made some mistakes up with right you have not taken in some parameter or you have made a calculation mistake in other words it is an error, so this is the traditional design process, this is the traditional design process for civil engineering, this is the traditional design process for designing software systems right.

Same thing you know you have a consultant who goes in and sort of understands spend some time understands what you know how the bank functions because they want to develop

computerized banking system then you come back and you shut yourself in with all your other programmers and software architects and all of that quality control testing, people etcetera and you come up with a system the idea is that you will launch it on you know the server or the mainframe or whatever off the bank that you are working with and it will run right and if it does not run there is a bit of a debugging but what you would like to do is eliminate the chance that there are bugs right.

So the ideally you want to sort of get to a point where you have the perfect solution right, so design is sort of essentially relatively linear gather requirements, use your expertise, come up with hopefully what is the best solution but what happens unfortunately is that it is not that linear primarily because this whole thing of gathering requirements is not so trivial ok, so when I say this is the load on the bridge what am I talking about is it the peak load on you know new year is eve where there are fireworks from the bridge, is it sort of the you know the average kind of can that loading condition change as the economy improves or goes down right.

S there are no precise answers to what is the load on the bridge right, it is not as if the bridge is you know going to have that load on any on you know every single day ok similarly with the software design example you might have observed a few people work right but have you really observed how everyone else everyone works and therefore are there functionalities for instance that you may not have observed that might be critical like I need only three gallons of water I do not need five right.

So whenever I try to get these requirements I often fail to get the complete picture right if I am good enough I will get a partial picture, I will understand how the (barre) the bank works I will more or less understand what is required of the bridge and all of that or I will understand how many the litters on average or gallons of average a person needs but there are always all kinds of exceptions.

You know to the rule give you a couple of examples that I have been through recently one is our own workflow system at IIT right which is now relatively stable right but when it was first launched a very similar process consultants came in I think they spent some time with the administrative offices trying to understand how courses work in IIT? how you know leave works or whatever and put in a system but then when many of us try to go in we found that our specific requirement was not met, ok.

Similarly another slightly more concrete example I am on the editorial board of a journal right and so what ends up happening is people submit papers and I have to find reviewers for those papers right so there is a workflow in place submit paper, I find people, I send it out to people, I give them a deadline, comes back sort of works well in the ideal case two people send in reviews then the third person says sorry I am too busy I would like to cancel, ok.

So now I have to figure out now ideally what I would do is I would find a third person I will give them a sharper deadline etcetera this system for instance said look as soon as people have given reviews you cannot invite more reviewers right which is a logic that for me does not work ok, so these people have talked to people to design this system probably works well in 80 percent in some cases certainly does it work well in mine.

So you have all of these kinds of systems and products and processes and so on that people design which do not necessarily work because it is very difficult to get a hold of all of these requirements and then very often you end up with what you have you know the classic comments of what you have done is useful but it cannot be used right, so yeah I mean nothing wrong and what you sort of did but you know I cannot really you know use it right or you did what you were I mean there were a few of these other sort of clever wordplay kind of trace, right.

So what design thinking does is it says this turn it turn this entire thing on it is head right so right now you have a linear process you say collect the requirements and then you are the genius right, so you go ahead and you because you are you understand programming better than anyone else you understand engineering design better than anyone else whatever it is right you go and shut yourself in a room and come out with the right solution right because you are a genius right you understand this space, you get the data, you should come up with the right solution that is the traditional design philosophy, design thinking let us says let us just switch that upside down, right.

Let us assume that we will never get the right requirements right and therefore if we do not get the right requirements it follows that we will not have the perfect design right so therefore number one as somebody I think Yamini you were pointing out it has to be iterated right, I sort of I welcome iteration right traditionally if I go to a design and somebody says no change this then very often it sort of means that I fail right I made a mistake right, so here there is no mistakes right we iterate.

Now therefore if I have to iterate I have to make one other change right if it takes me a year for every iteration right it will take me forever to get agreement on anything right, so typically if I want to design a metro rail I give you a design contract I expect you to take six months to a year to design ok then if I come in and say oh by the way this does not meet the need of many of our passengers yes it meets the need of some people but by the way your platforms have to be wider, they have to be longer you need to have other kinds of access ramps and I give you all of that feedback which you may not have collected earlier and if it takes you one more year to go ahead and do that design then we will be stuck here forever right by that time some new technology would have come up and you would say oh no I need these kinds of telecommunication devices I will go back one more year right.

So therefore not only I have to be iterated but I also have to be rapidly iterated right, so rather than taking a long period of time and shutting myself down and coming up with the perfect design can I shut myself off for a very small period of time come up with essentially an iterated prototype I understand there is a prototype I have no expectation that this will be the correct design right but I bring it back to you quickly to get your feedback right, so in other words I am now going away from trying to give you a finalized design to giving you designs that elicit feedback.

The purpose of the design is no longer for you to say wonderful congratulate and clap the purpose of the design is for you to give me feedback and say oh yes you took these things into account I had not told you these because it never struck me but now it does now that I have seen it why do not you sort of do one more iteration and because these iterations are fast and rapid right you have a different design cycle that is much more rapid, prototype focused, faster and therefore includes more and more people is needs and therefore a couple of you were saying design thinking takes into account more needs in the traditional design process that essentially is how it happens right.

So that fundamentally is the design thinking process I will show you a slide and then I will show you a video right.

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So essentially if you follow there are variants of design thinking I tend to like the one that the D school or the design school at Stanford came up with to sort of describe this.

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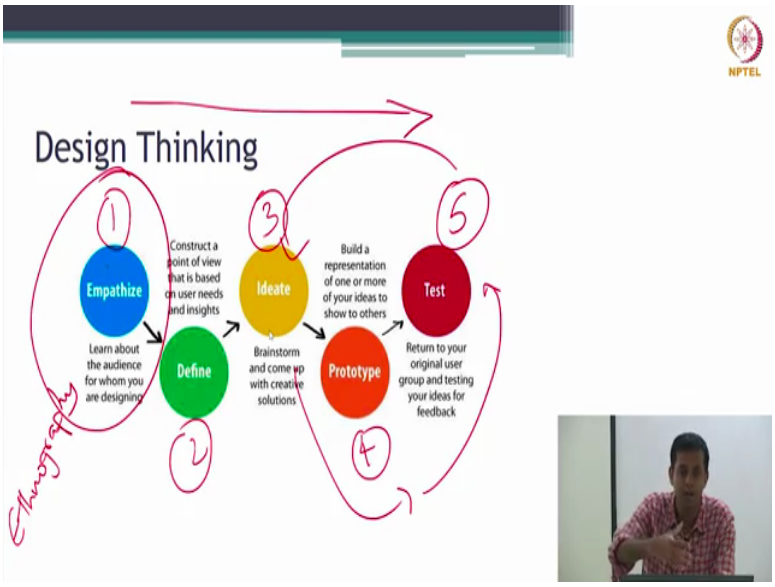

I mean all the other variants the one that so they put out is a variant of this right, so essentially they say look if you go through five phases right, so this is phase one right empathize which means learn about people that you are designing something for right, it looks simple right but it is not I mean look at the average home builder ok the person who is building these apartment complexes and think about how much time are they really spending understanding the kinds of people who are going to live in that building, how much time do

you think they're spending understanding the kinds of people that are going to live in the building that they are going to build, right.

So I am some developer XYZ developer I am going to develop high rise apartments or whatever townships sell them etcetera how much time do you think I am spending on understanding what these people do right often very little right often you have an idea of oh you know people tend to like 3 BHK three bedroom hall kitchen you know apartments with attached bathrooms, one car park maybe a small puja area whatever.

So you have this kind of templatized ideas on which you design and then you actually find out that this quite a bit of redesign that ends up happening right because you know young people have a very different view of what the houses should be like right so they are probably looking at you know entertaining people you know buying 75 inch flat screen TV is and calling everyone over to watch, I know a football match or whatever which means fundamentally you need to have wall space to do those kinds of things right when you have young kids you are thinking about safety right when you are much older you are thinking about possibly a variety of different things.

So perhaps depending on who you are thinking for the design needs to be fundamentally different right so this is essentially phase one it sounds obvious right think about who you are designing for but often do not really get to do, once you do that you can actually start defining the project brief right which are your requirements on the project right so you do not just say ok can you just tell me give me the requirements you actually spend considerable amount of time learning about these through a process called empathizing which essentially involves what one might call ethnography right which is the study of people, which means ideally you would immerse yourself in a social setting to sort of understand what people are doing.

So if you were to design an old age home right one thing is you know let us talk to people about what older people want ok and yeah obvious things come to mind yeah they obviously they cannot climb stairs, so they needs to be you know access this is this that you whatever they are a bit clumsy and therefore I need to design whatever but there are when you but when you actually live with older people you might find a lot of other clues on what they do for entertainment how they engage with people and therefore how the space that they are in should be.

You could do the same thing for this classroom by the way all right, so we have sort of a notion of what classroom should be like but maybe if you actually sit in a class then you have a better understanding of whether you have the right kind of ventilation the right kind of spacing between benches the right kind of acoustics all of that come to mind right. So after that you define right and then you kind of brainstorm and this is your this is where your intelligence come in, your skills come in your sort of design but and here is where it becomes interesting.

You start developing prototypes right which means in as little as three days, a little as a week, little as a fortnight you come back with something right and that something may not be one of these reams of blueprints right that you see in in engineering trailers and so on that something might be a sketch, it might be a thermocol model or whatever it might be a you know a small beam prototype and we will talk a little bit about that later but it is a prototype right on which you say ok, this is what it is going to look like right what do you think.

Now that there is something physical in front of you, you can actually engage with it right so one of the causes of delays and construction is because people say the clients make changes all the time ok and contractors are very upset everyone is very upset that the client is making changes and therefore more work is being extended and projects are being delayed, ok but if you talk to clients right and say why are you making changes right the client essentially says look when you showed me a bunch of blueprints right I could not understand what this thing looks like now when the thing is actually in front of me now I understand that the conference room is no longer as large as I wanted it to be right that the bathrooms are too far away on one side and it is highly inaccessible because this is where most of the people are going to be working right.

So while yes that information was there right but it is only so much that I can get from 2D drawings when I see it life is where I really start getting these ideas and so now I want to break open the conference room, I want to shift the washrooms to this side etcetera which is a highly time consuming and expensive process right but this happens because I now have a prototype unfortunately in this case the prototype is the real thing right what would not be nicer if I were able to build you know better prototypes that people could touch feel etcetera come up with these ideas but much quickly.

So then I have essentially a testing phase I have I am under no illusion that my prototype is going to be a final design right in fact when I built my first prototype mentally I probably I

am very clear that I am going to build at least 14 more prototypes before I get to the final design, so there is nothing lost I am not embarrassed you know I am not sort of taking it badly that you are giving me adverse comments on my prototype that is what I want ok, in this process.

And now I start going through this cycle ok, so I tested it okay I got some ideas I go back I edit I come up with a second prototype right I test that again ok maybe fulfil some more needs but maybe there are a few other ideas that come out so on and so forth over and over until I actually get a design that I know that works for people which I get that manufacture or fabricate or whatever right.

So essentially this is the design thinking process traditional design is somewhat linear right give me the requirements I am the expert I will shut myself in a room and I will come up with something which will work right and what history has shown us is it really does not whereas this design thinking process essentially says do not even think you can design it right the first time all right, so you are going to take a long time to understand what people do, so go through a rapid set of iteration so you can get those ideas out better and you are more likely to come with a design that is useful ok, make sense, okay.

So in this entire process that we are seeing on the screen here where do you think you would spend the most amount of time?

Student is answering: (())(28:32).

Ok, or each of you have picked one of the five but somebody said empathize who said empathize? That how many you said emphasize? I agree I think this is the key and most difficult part really understanding trying to understand what people want right and we will do a small exercise little bit later in the class where essentially I am going to have you guys pair up and design you know a wallet for one another right, so a wallet, a purse whatever it is you guys want to design right something if you carry along with you ok.

But a lot of things that we design you really need to understand what it is that you are designing for what do people need at want? Right and so what are the concerns and the reason this is important I think in an infrastructure class is there is no reason I mean you can apply this to design so we will see now in the video but the mouse here apparently was designed using this kind of a design thinking philosophy right because obviously I want

something to move around but what should it be like? How big should it be? What are the functionalities and so?

It is sort of a unique thing right it has a certain form factor, it has a certain standardized there is a key role in the second and most of us I mean how many of you are relatively comfortable using this? Right most of you are relatively comfortable anyone particularly uncomfortable right I am sort of normally quite comfortable using this right and that's because it is come through this kind of a process right where you understand you know ergonomics of people, what they want to do, questions in terms of how far can it be you know how quickly must move etcetera, right.

So you use this to design everything from you know could be walking stakes, could be this we will see an example of a shopping cart in just a second but the question is why cannot you use the same principles to design infrastructure right, so if you are designing a dam and part of that dam is for hydroelectric power, a part of it is for irrigation etcetera have you really thought about the various people that you are trying to design it for and what they want out of the project, right.

So what kind of electricity requirements do they have? Will the dam fulfil it? What kind of irrigation requirements? What kind of drinking water requirements? What other kinds of requirements are there in the facility? Right so the same idea of empathizing and then maybe trying to come up with prototypes and we will talk about how that is done in the infrastructure case could work here as well.

Correct so and that is exactly the point that they so your argument is Kanako used the design thinking approach right but fail my argument is Conoco did not go anywhere close to using the design thinking approach, the design thinking approach and we have talked about this earlier as well would have said let us talk to some people let us quickly turn around not a 3,500 page document but a 5 page or 10 page concept plan on what we want to do, let us start getting more ideas right and then go through that process iteratively.

A bit of course before doing that process spend a lot of time talking to the NGO is first right before you even go ahead and show them something so that would have been empathized rapid prototyping all of that right but Conoco did almost the opposite hardly spoke to anybody and then came up with something that was so over designed that people did not believe that this was a prototype to test.

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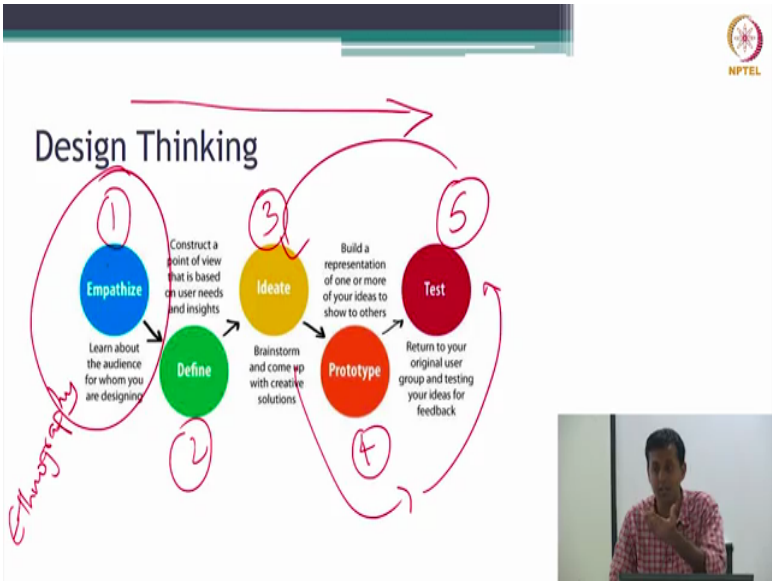

So and therefore of the complexity so the point is that infrastructure projects have most stakeholders involved, so the complexity of doing the design thing exercise is obviously order of magnitude different compared to designing a shopping cart or whatever where you have you know a few people that you are trying to design it for or a few categories of people whereas here you have displaced people, you have flora and fauna that you are actually destroying in the case of this dam, you have the sponsors, financers etcetera.

So it is order of magnitude difficult and therefore you may not be able to do it in exactly and therefore then there are also time constraints and therefore you may not be able to do this exactly as systematically as you would like but the point is there is a philosophy here right there is a philosophy of designing a project which says do not just go ahead and design and come up with detailed project reports and cost estimates and schedules and all of that and say here this is what we are going to do right, can we do it in a more iterative fashion right, can we spend a lot more time than we normally do right understanding what the needs of the stakeholders are right.

So very often you have governments in a hurry to launch projects and they say ok what let us give out this contract in six months I need a design right can we actually spend more time on the front end of these projects doing that empathizing and can we go through some kind of an iterative phase on the design and we will talk about the Srirangapatna case in terms of how that could be done on infrastructure project.

But this is essentially a traditional design linear design thinking spend more time empathizing understanding your customer right and spend more time iterating rapidly, rapid prototyping and iterating over designs you are more likely to A end up with the right design or B end up with the design bad who cares whether it is right or not the design that people accept because they feel that we have been part of the process right.

So last class we talked about the fair process right and how people often need to be engaged to find acceptance right and Design Thinking could be something that enables this fair process argument in infrastructure ok and I actually brought this video with me, so if I can I will just play it out.

Video starts here:

(Refer Slide Time: 33:18)

Person 1:

We went to idea of the product design folk and said take something old and familiar like say the shopping cart and completely redesign it for us in just five days, ABC News correspondent Jack Smith tells us what happened next. 9 in the morning day 1 and these people have a deadline to meet, so welcome to the kick-off of the shopping cart project, this is Palo Alto California in the heart of Silicon Valley and these are designers at IDEO probably the most influential product development firm in the world.

IDEO has designed everything from high tech medical equipment the 25 foot mechanical whale in the movie free willy and the first computer mouse for Apple, Smith ski goggles, Nike sunglasses, any see computer screens, hundreds of products we take for granted.

Person 2(Tom Kelley):

The point is that we are not actually experts at any given area you know we were kind of experts on the process of how you design stuff, so we do not care if you give us a toothbrush, a toothpaste tube, a tractor, a space shuttle you know a chair it is all the same to us we like want to figure out how to innovate in by using our process applying it.

(Refer Slide Time: 34:33)

Person 1:

Project leader is Peter Skillman, a 35 year old Stanford engineer project leader because he is good with groups not because of seniority he is only been at IDEO for six years the rest of the team is eclectic but that is typical here, Whitney Mortimer Harvard MBA, Peter Coughlan linguist, Tom Kelley Dave is brother marketing expert Jane Fulton Suri psychologist Alex Kazaks 26 a biology major who is turned down medical school three times because he is having too much fun at IDEO, safety emerges early as an important issue.

Person 3 (Jane Fulton Suri):

22,000 child injuries a year which is in severe hospitalized injuries I mean there are many others.

Person 1:

And theft it turns out a lot of carts are stolen as the team works it becomes clear there are no titles here no permanent assignments.

Person 2 (Tom Kelley):

Near the side says give us a lot of help says be safe I will give you a big red ball on a post and that says you are a big guy if you got a ball you are senior vice president you know what do I get over the desk at red ball it is all seniors in, a very innovative culture you cannot have a kind of hierarchy of here is the boss in the next person down the next person down because it is impossible that the boss is the one who is had the insightful experience with shopping cart is it is just not possible.

Person 1:

The team splits into groups to find out first-hand what the people who use make and repair shopping carts really think.

Person 4:

Ok, go probably the plastic cart is the wind catches it, yeah and these things have been parked at 35 across the park yeah that is actually pretty good point.

Person 2 (Tom Kelley):

The trick is to find these real experts and so that you can learn much more quickly than you could by just kind of doing in the normal way and trying to learn about it yourself.

Person 5:

From everything I read these things are not that safe either you know, so probably the seat itself is going to have to be redesigned.

Person 3 (Jane Fulton Suri):

One of the interesting things for me is looking happy people really do not like to let go of the cart accepts a good professional shopper whose strategy is to leave the cart at various places.

Person 1:

It 3:30 in the afternoon and the group is back at IDEO, there is no let up.

Person 6 (Peter Skillman):

Each team is going to demonstrate and communicate and share everything that they have learned today.

Person 7:

A shopping cart has been clocked at 35 miles an hour, traveling through a parking lot in the wind, give in the store what two hours and it was truly frightening just to see the kind of stuff going on.

Person 2 (Tom Kelley):

You have to designate some people to make damn sure that the store hours point of view is represented.

Person 1:

After nine straight hours the team is tired, they call it a day.

So that is great, thanks a lot we had a great time today, yeah.

Person 1:

Idea was mantra for innovation is written everywhere one conversation at a time stay focused, encourage wild ideas defer judgment build on the ideas of others.

Person 6 (Peter Skillman):

That is the hardest thing for people do is to restrain themselves from criticizing an idea, so if anybody starts to nail an idea they get the bail.

Person 1:

The ideas pour out that are posted on the walls.

Person 6 (Peter Skillman):

On the blind be the privacy blind like when you are buying six cases of condoms you know answers, if it does not nest we do not have a solution.

Person 7:

Ok, nice kid it is not organized what it is focused say yes vote with your post it not with an idea that is cool but with an idea that is cool and buildable if it is (())(38:02) if it is too far out there and it cannot be built in a day then I do not think we should go and vote on.

Person 6 (Peter Skillman):

Enlightening trial and error succeeds over the planning and blond genius.

Person 1:

Enlightenment trial and error succeeds over the planning of the lone genius if anything sums up IDEO is approach that is it, that worried that the team is drifting what can only be called a group of self-appointed adults under Dave Kelley holds an informal side session for five we and we give each team a need area it becomes very autocratic for a very short period of time and defining what things people are going to work on.

Person 2 (Tom Kelley):

If you do not work under time constraints you could never get anything done because it is a messy precedent go on forever.

Person 1:

One back of the shop it is 6 o'clock before mock-ups are ready for showing.

Person 7:

Baskets also can be easy if you think you will have more volume baskets can be put in.

Person 1:

A modular shopping cart you pile hand baskets on tour, high tech cart that gets you through the traffic jam at checkout that.

Person 8:

You could mount a scanner on the shopping cart so that you as the customer as you pull it off the shop with scanned each item.

Person 1:

One that is built around child safety and another that let shoppers talk to the supermarket staff remotely, yeah where can I find a yogurt? Yogurt (())(39:23) but the adults again decide more work needs to be done before the mock-ups can be combined into one last prototype.

Person 6 (Peter Skillman):

When we have all the parts Come up here for a second.

Person 2 (Tom Kelley):

I think you take a piece of each one of these ideas and kind of back it off a little bit and then put it in there yeah in the design.

Person 1:

The design is still not there but there is another motto at IDEO fail often in order to succeed sooner. As some of the team will be up half the night trying to put together a design that finally does work.

(Refer Slide Time: 39:53)

Person 6 (Peter Skillman):

There it is, so we took the best elements out of each prototype.

Person 1:

The cart which is designed to cost about the same as today is carts is different in every other way.

Person 9:

What do you think?

Person 2 (Tom Kelley):

Well I am very proud of the team I think it is great.

Person 9:

This is does this work for you?

Person 2 (Tom Kelley):

Works for me great, it is also beautiful.

Person 1:

The carts wheels turn 90 degrees so it could move sideways no more lifting up the rear in a tight spot and you shop in a totally different way, the bags are hung on hooks on the carts frame remember there is no basket here.

Person 10:

At first I was a little shocked but I think it is you have some fantastic ideas here, it needs a little refining that I think that it is great I mean we would want them.

Person 6 (Peter Skillman):

It is one thing it is some really good comments that how we can make this thing better.

Person 1:

A lot of hours also an open mind, a boss who demands fresh ideas be quirky and clash with is a belief that chaos can be constructive and teamwork a great deal of teamwork and these are the recipe for how innovation takes place this is Jack Smith for nightline Palo Alto California.

Video ends here.

Professor:

Ok, so that was a pretty good rendition of the overall design thinking process so clearly you guys saw part of the empathizing phase where you had these guys go into the store and

actually interview shoppers watch how people were shopping? And interview everyone right the security guards, the store owners, the shopper so shopping cart is not just for shoppers security guards also have a role to play.

It is a lot of empathizing that they come back, they define ideative saw prototypes being created relatively quickly none of them were really polished, finished but just to sort of give the feel and of course they did not do as many iterations because this in some ways was a was staged in some sense in the sense it was done as a challenge it was done to sort of create that video etcetera, so they did not do as many iterations as they might have but you could clearly see a few iterations before the final shopping cart came out and some testimonials from the people, right.

So that is a very quick run through of how the design thinking process works which you can contrast with yourself you know terms of how the traditional process would have worked where you know somebody says ok this is what I want with a cart right it should be able to carry 300 KG is of groceries right and so you go in and you design and you make sure that flexure and torsion and all of those are met etcetera then you come up with a cart which is fine but may not have taken care of child safety right, may not have taken care of the fact that as somebody says there are these ramps and it is going down at 30 miles an odd can actually do some damage right, so all of those kinds of things.

So the traditional design process would still have come up with a design but maybe this design process helps come up with a better design and maybe there is not that much of a time difference either because you are rapidly prototyping right. So that essentially is the essence of the design thinking process, now to see how it might potentially be used in infrastructure setting, Yamini why do not you come up and talk to us about the project in Srirangapatna.