User Interface Design
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Lecture - 04
Design Methods - II

Hello students, welcome to the online NPTEL course, User Interface Design. In the previous class we started discussing about the generic design methodology. We will continue that in today's class as well. So in generic design methodology we have discussed about the Donald Norman's theory of how the design process looks like a double diamond.

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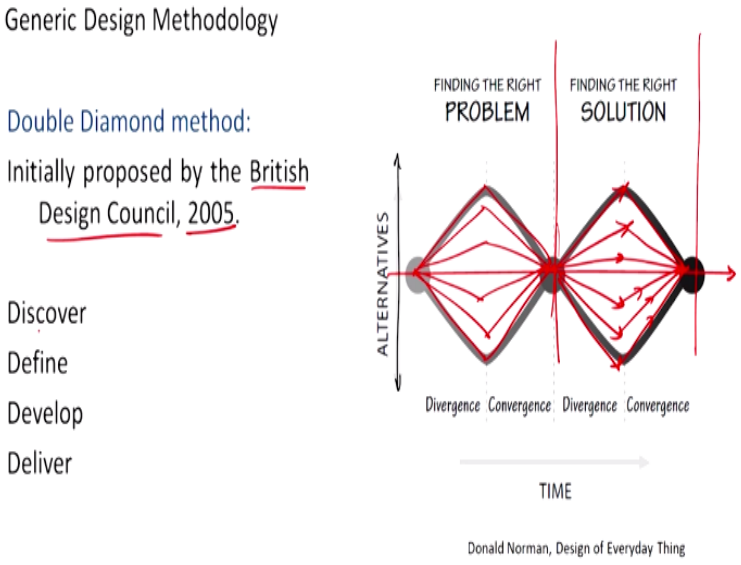

If you look at this figure and when plotted in this axis as different alternatives and in the other axis over the time. So over the time based on the different alternatives of problem solving as well as the solution finding it looks like a double diamond in case of the option so we start with the problem and what is the real cause of the problem, then multiple options bifurcates from here and then finding the right cause of the problem.

And coming to the need statement creates one diamond and then from the need statement or when we are defined, we have defined the problem, then finding multiple options to cater to that solution. Again it diverge and then again it converge into one best or optimum solution for this particular case. So this convergence, divergence and again convergence and divergence for

finding the right problem and next finding the right solution is the double diamond method which is initially proposed by British Design Council in 2005.

So this 4 stages are discover, this is discover, this is define, and then develop and then deliver. So these 4 stages were there. And there are different other models which also confronts with this double diamond method. The same process but a little deviation from the same process and many other designers and marketing people have developed the other models which are also quite similar to this process.

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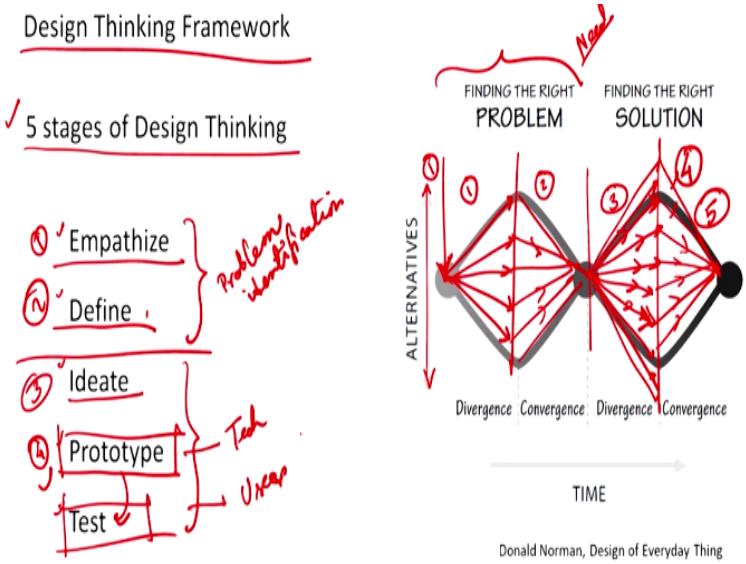

The other model is the design thinking framework. This is commonly used in many design firms and this has 5 stages of design thinking. Design thinking is the term where this is the process focused on the design and how designers think and how they design and how do they deliver. So this also has the 5 stages and this is also quite similar to the double diamond method. So first is empathize with the user when actually designers are finding what is happening with the users, what is there, the need.

What is the exactly the natural phenomenas are happening. So this phenomenology and ethnography where designer start with. So this is the starting point, the stage 1. Then they start designing so when they empathize then they start finding different problems, what users are facing. So this is kind of this stage empathize and then they try to define, define the problem

which was also there in the double diamond method this define stage or defining the problem and then achieving the need statement.

So defining the exact problem looking at from the user's perspective understanding the user's need through ethnographic survey and user survey. So this is the process number stage number 2 which is defined. So this is what comes within the finding the problem or where you are defining the need statement. So here we achieve at the need statement of the design. So where exactly what we are designing so that kind of freezes over here.

And I should not use the term freezes because we have already discussed that this is the iterative process. So when we go for the user testing for the low fidelity prototype which is not exactly designed or not exactly frozen so that time the concept again starts getting validated by the users. So that time if there were some big problem then the need statement can even be changed. So we can even go back to this stage from any other stages if the product is not satisfied.

So this is not frozen. So things are flexible in this process and this is a iterative process so many of the times from each and every stage you can go back if that stage does not fulfill the requirement of the user. So this is the stage 1 and stage 2 is finding the right problem, problem identification. And then this is the process where we go back to the next phase of the diamond.

I am comparing this to model because Donald Norman's double diamond method is first we discussed and most of the other cases in this generic design methodology so that fits into the similar process. So next the third stage is ideate. When after this finding the need statement we start, designer start ideating the different solutions. So again in terms of alternative it expands. So it is again divergence and designers create different options to cater to a particular need.

So they look for different kind of options and then the multivariate options they create. So this multivariate options are mostly the low fidelity design. So multivariate means for one particular option there are different solutions. So for particular need this can be solved they try to think how a particular need can be solved in different various approach. So here that is how they are diverging.

So this is the ideate phase when they diverge and they come up with different ideas. So there are some tools to ideate which we will discuss later like brainstorming. When designers, a group of designers sit together in a particular place and then they start giving different ideas. And all these ideas are jotted down in a particular way and then this creates multiple different options.

Then each and every idea they start developing from feasible ideas they start developing the initial prototype and then they start doing the testing. So the fourth option is prototype. When the ideas come so different ideas then they diverge from each other and more designers expand during this process of brainstorming or idea generation, there can be different other tools of idea generation, not just brainstorming.

So they diverge better the option of coming up with the right solution, greater the probability of coming up with the best solution. So from here few of the ideas get deleted because of the feasibility problem or the technical issues or the problem of even it can be problem of the rejection from the users. Then they start narrowing down and they select few options which can be manufactured or which can be implemented, implementable ideas get selected.

So again they start converging into a particular point and few of the ideas get deleted. So this is the prototype stays. So few of the ideas get prototyped because which are feasible to prototype which is feasible to manufacture in terms of product design or which are feasible to implement, to program or code in terms of web design or user interface design. So those get selected. So this is process of within the divergence.

And then those prototypes which are low fidelity or the initial prototype or the mockups then they get tested with the users. So users to test those ideas and few of the ideas even get rejected because which does not fulfill the user's need. So again they diverge within this stage with the testing which kind of gets validated with the user. So this prototyping, the feasibility of prototyping which is the technical issues and the user selection.

Based on these two process they start diverging and they narrow down to the best optimum solution which they are right there and then the market launch. And each and every stages it can be even repeated and it can go within the loop.

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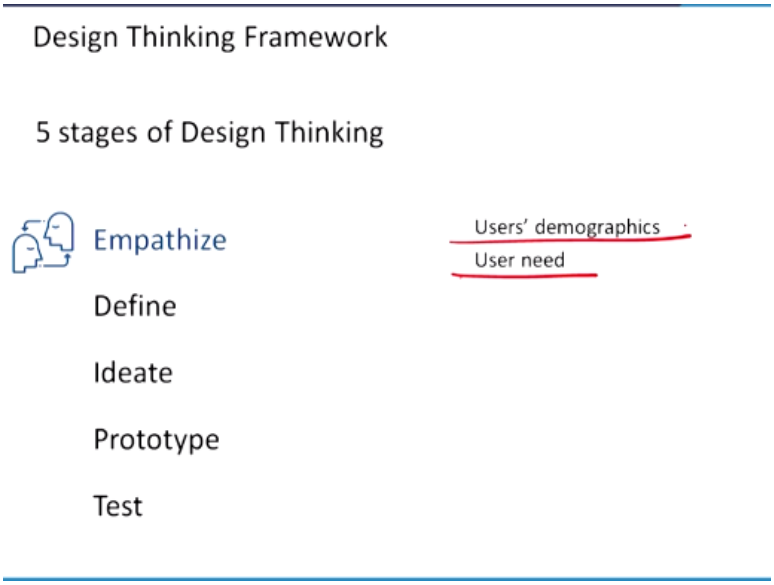

So the first stage which is empathize which we have already kind of discussed. So this is user's they try to understand user need based on the user demographic segmentation. So user might have different particular need. So we will discuss just what is segmentation and creating persona in next or the later classes. So demographics is when users are divided into different segments.

So based on their age, sex and their location their preference and their social cultural behavior. So based on different kind of demographics segmentation can happen. So when we identify the particular user group and then we can identify their need. For example requirement of a user who uses who has their own car and the users who are more comfortable using the public transport are different and even the users who have a particular habit of using a particular device, their behavior will change.

So there can be different other ways to segment a particular user group and based on this identifying this user after that we start doing the ethnographic survey and observe their phenomena. So identifying the particular user, who is the real user that becomes a very important task for the designers.

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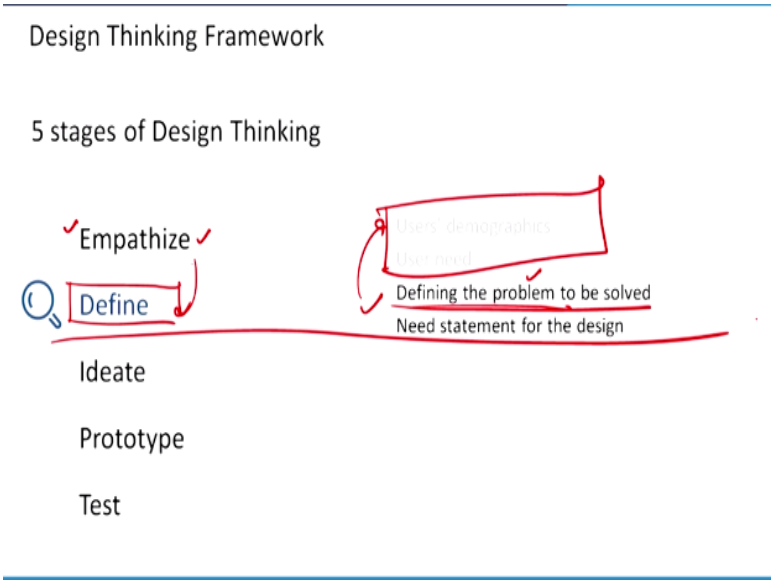

Then the next stage designers start to define. So defining the problem what users have and this is again each and every next stage is dependent and the function of the previous stage. So if we identify the right user then we can through their demographic classification then we can define their problem. Otherwise the problem identification and everything will be wrong if we do not identify the users and we do not have the proper user survey which is within the empathize stage.

So defining the right problem and which is kind of a analysis of user survey. So when we do the user survey this is the stage of empathize and the analysis of the user survey which we have documented while visiting the users and how do they interact those documentation through video recording or whatever or just observing that documentation happens and when designers start to ask why do they behave like that, why are they interacting with the web page like in that manner.

So that analysis helps the define stage. So we find out what exactly is the cause, might be the cause of that behavior and what might be the real problem. So the problem identification happens during here and it kind of becomes almost freezes over here. So we achieve here to the need statement by defining the right problem which has to be solved which is the need statement of the design. So need is fixed and then the design process starts.

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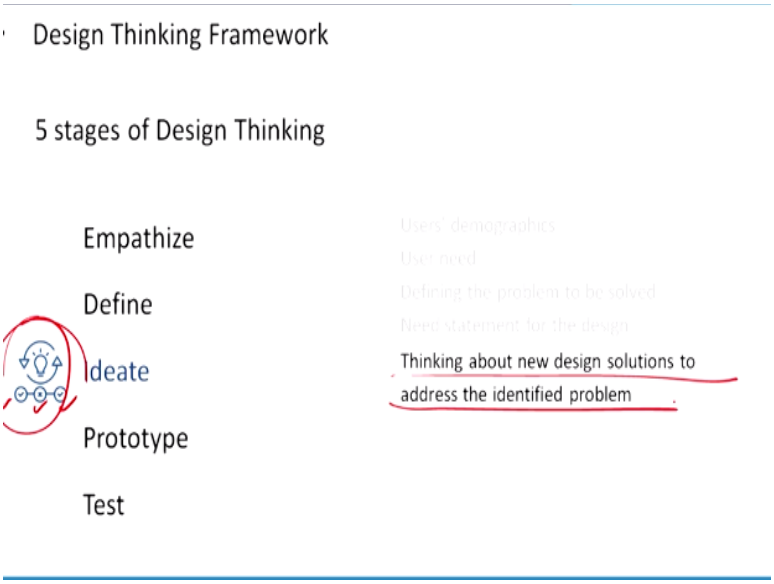

Then ideate, different ideas are generated in this stage. So thinking about new design solutions to address the identified problem. Different other possibility and different ways of tackling a particular problems are explored in this stage.

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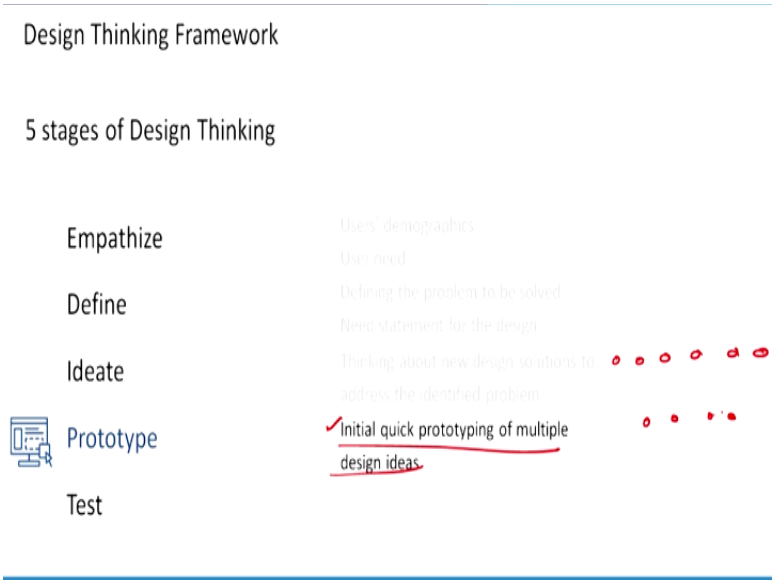

Then prototyping. Initial or quick prototyping of multiple design ideas which can be prototyped. Definitely the number of solution over here might be more than the number of solution which will be prototyped. And then this initial prototypes which are very quick prototype and these should not be the proper exact working prototype. It should be very quick and within the initial stages to understand whether this design idea will work or not.

If designers ask for a detailed prototype then the money involved, the cost of making this prototype will be very very high. Because in case of product design making a particular dye or the mould is very costly. Similarly, in the web design programming everything or making a proper working website will again going to cost the company because the programmer will be paid and they will program the website or web application or other UI components.

So few of the options will be prototyped and it can be just the programmer will not even be involved into that. It can be just a sketchy design concept. It can even be on the paper and some sketch on the paper to ideate these are the initial design ideas in terms of UX design and that can be shown to the users to get an idea whether this design will work or not. So even the visual design components does not come within that.

So no colors, just the wire frame or the sketches which designers go with this sketches on the paper which is called paper prototype to the user and definitely no programming and it might be interactive in next or later stages or might be some color combination might be added over there but within in the next stage but initially it is just a sketch on the paper.

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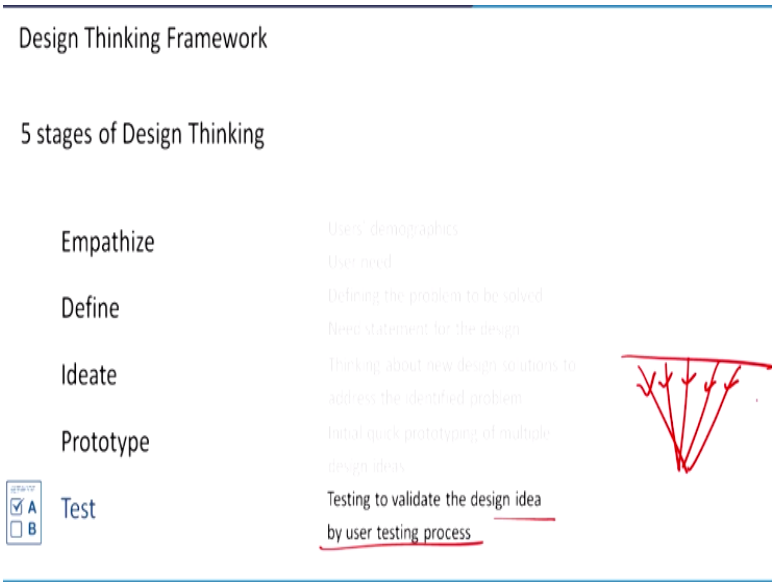

Then this ideas will be tested and then the testing is to validate the design idea by the user testing process. So user select and gradually when we move towards the narrowing down of this to the funnel we from this low fidelity or quick mockup too we generally go towards the high end or

the high fidelity prototype where the color comes into picture. Proper shape and proper button comes into the visual design.

Visual design components get added and sometimes the interactive prototype even comes and sometimes this is also the programmed prototype also gets tested where we do the A B testing or multivariate testing, 2 different program can also be launched before coming up, the beta version can also be launched before coming up to the final version. So that depends on in which stage the design process are in. So it starts with a sketch on the paper.

Now there is another model called Six Sigma process of design. The Six Sigma process of, this process did not evolve exactly from the design domain. It evolved from the manufacturing domain. But later it got adopted into the business world and as well as the design.

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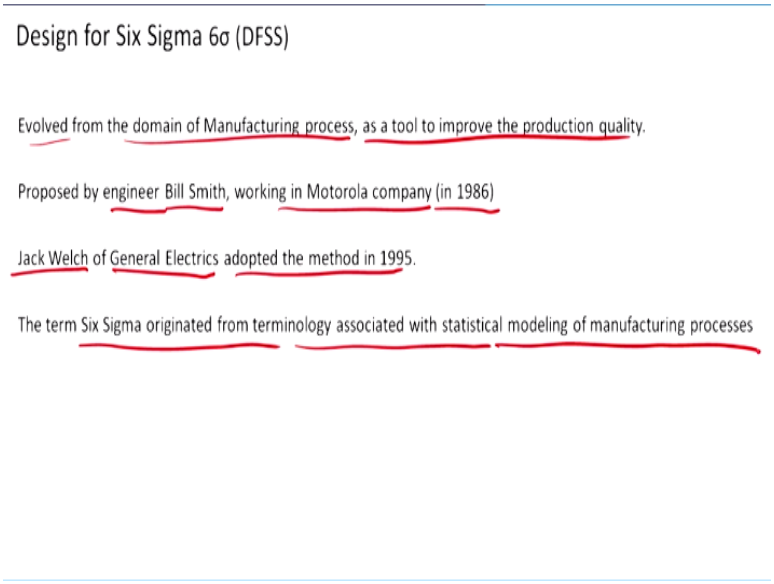

So this process Six Sigma is evolved from the domain of manufacturing process as a tool to improve the production quality. So this is proposed by an engineer Bill Smith working in Motorola company in 1986. Another designer, another inventor Jack Welch of General Electrics adopted this method in 1995 in his company for the better manufacturing process. The term Six Sigma originated from the terminology associated with the statistical modeling of manufacturing the process.

So this Six Sigma it evolved from a statistical model. So they wanted to achieve this Six Sigma value for a constant process of manufacturing so that the deviation of the end product does not vary much. So all the time they wanted to ensure that the final outcome is homogeneous.

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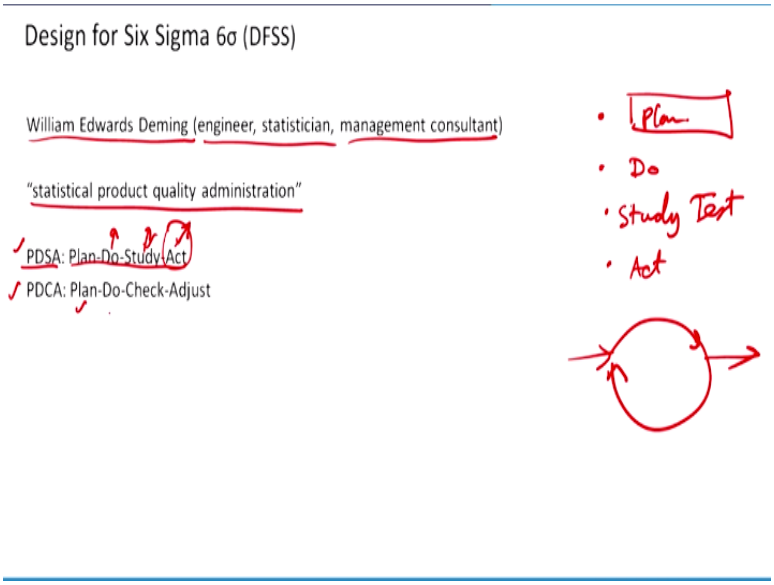

So William Edward Deming an engineer, statistician, and management consultant who developed a process of statistical product quality administration which is also along the way of Six Sigma process and he developed this plan which is called Plan, Do, Study, and Act and which is in short which is called PDSA. So first plan, then do, and then the study, study how it is performing and then take action accordingly.

So if you look at the process of manufacturing, first the manufacturing process has to be planned. So which is like first the process planning and which is kind of like similar to ideate and then the do which is kind of similar to design and then the study which is like testing whether study is like testing and if the test is fine then there should not be any action taken. Or if the test has some, test tells that there has to be some modification required then the act, so based on the testing.

So this is also like something like a iterative model of design. So this is not a design model. This is a manufacturing model. But iterative model of design is quite similar to that. So first the design idea comes. And then it gets tested and until and unless this testing is satisfactory then the

final thing is not delivered. So this loop goes on based on the testing whether the model is fine or the action which has been taken is fine and then the study comes and then the action is taken.

So do in terms of design will be designing or developing the idea and then the study will be studying with the validation part which is prototyping and testing. So that is the process of studying whether study the idea whether the idea works or not. That is the study part in terms of design and then the designers take necessary action to whether this design idea will if the design idea fulfills the requirement then it is fine or iteration modification or totally changing the total deletion and total alteration can happen.

So either it can be a modification or total alteration of a design. So that is part of the act within the stage of act. So that is the his model of statistically how the manufacturing of the product can be controlled. So over the time this also had another name for the similar process which is PDCA instead of PDSA, PDCA which is quite similar; plan, do, check, and adjust. So instead of study what exactly we are doing is we are testing or checking whether this works or not.

So plan and do remains the same. So planning is the process where designer start empathizing with the target audience or plan for where the how the product will cater to the user domain. So all this process is planning and then do in terms of which is designing, creating multiple options, multiple ideas. Then checking is again testing or earlier it used to call it study. Or here it is checking or testing. So user testing after prototyping, different prototypes can be tested.

And then adjust whether modification or alteration or total alteration or little modification that is the part of adjust. So adjusting the idea according to the need statement or what the users need. So that is the model of William Edwards Deming. So this is not the Six Sigma model. This is PDSA or PDCA model.

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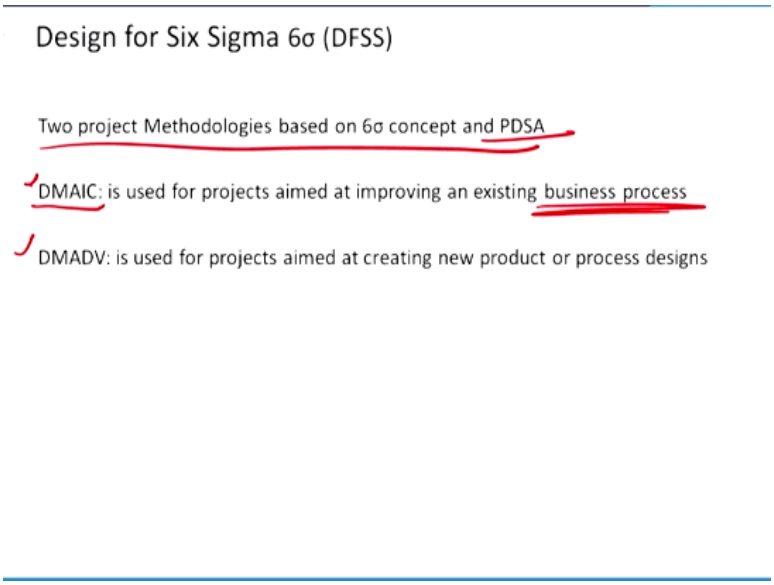

So based on this Six Sigma model which we have discussed just before that and PDSA or PDCA model there can be two process of design which is again similar to the double diamond method or the design thinking framework because that is what the model is in design. So many different company call it they name it in a different way and based on the, the same process but it can be 4 stage, 5 stage but almost they are doing the same work within that timeframe.

So there can be two process which is based on the Six Sigma concept of designing. So one is DMAIC so which is mostly targeted to the business process. And another is DMADV which is for the more relevant for the designers which is the process of designing. So DMAIC the first process is used for the project aimed to improving an existing business process. So they try to improve that process of manufacturing process or the business model.

Then the DMAIC process is implemented. But mostly this 5 stage process are quite similar. And then DMADV model is used for the project aimed to creating a new product or process of designing.

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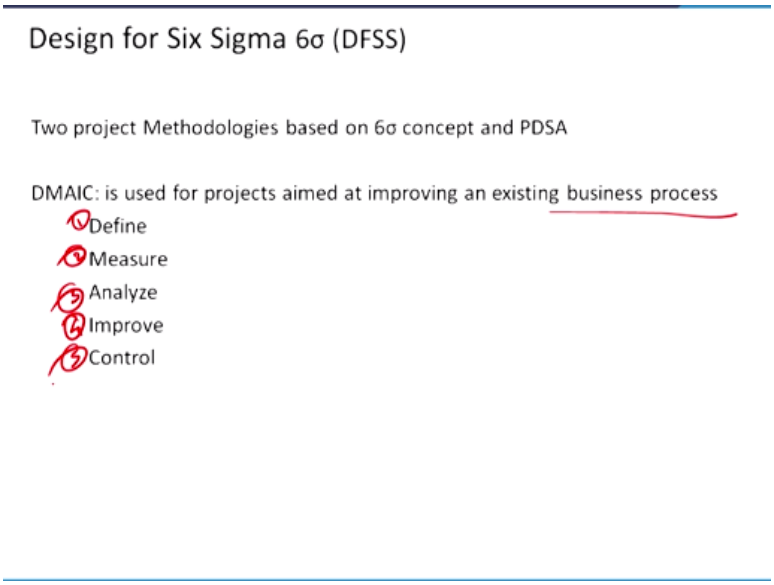

So first DMAIC model which is used for projects aimed at improving an existing business processes first define, which is again quite similar to the double diamond methods. Then measure, then analyze, then improve and then control. So improve and control by this name you can identify this is going towards the user testing process. So first ideate and testing. So this loop is there within this.

So if we elaborate this processes we can see this is again quite similar to the model which we were discussing. So all these generic design models are quite similar to each other but they have proposed by different designers or engineers or management consultant and then they have slight different name.

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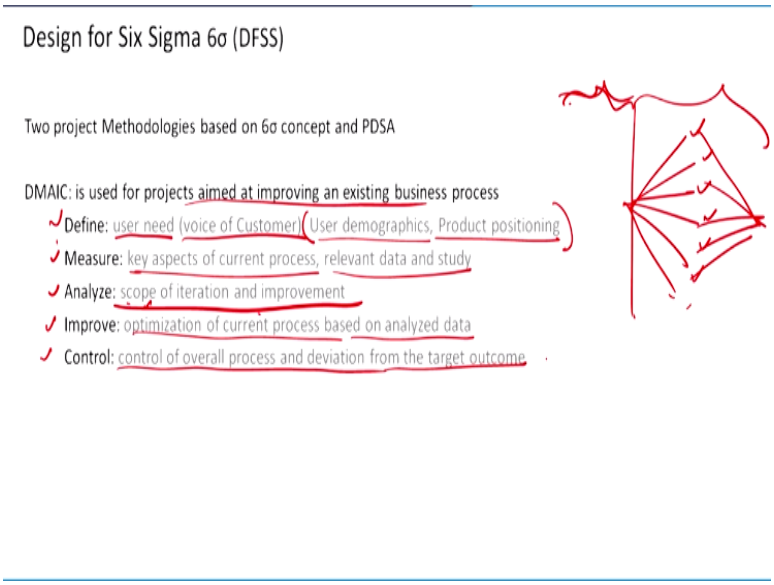

So define is identifying the user need and voice of customer what customer wants which is based on the user demographics and the identifying the real user and how we want to position the product. So product positioning which we will discuss in due course of time. So product does not mean just the tangible product in terms of industrial design. It can also be the website, website is also a product of intangible media.

So how we position the final product according to our user group, target audience that is the product positioning. So how we want to see the product. It is basically the need how users will interact with the product and what will be the performance of the product in this case this is website. How will the product will interact with the users. So that is how the product is positioned. And in which segment of the user group will be targeted to be the product.

So this is the defining stage, so identifying the process. And then measuring the key aspects of the current process, relevant data and study. So what is the exist because this is aimed to improve the existing business process. So studying the business process, the case studies comes within the picture. So alternative other cases where this kind of similar process has been taken or existing process which company is taking and studying that and key aspects of the current process.

And measuring where are the loopholes and where it can be improved which is in the next process. So they study first and measure what is the exact thing is happening and then they start

analyzing the scope of iterations and then they start documenting whether this is the iteration whether it will improve or it will decrease the value or some other probable options of iterations whether that is leading to the improvement of the process or not. So that is the stage.

So these are kind of similar to generating multiple ideas. So process, the scope of iterations when they are thinking. So they are actually divergence of different ideas and different scopes. And then they start thinking whether this is leading to improvement or not. So this is in the solution process. And the problem identification is define and measure. So then improve optimization of current process based on analyzed data and this is kind of narrowing down to a solution.

And then control, control of overall process and deviation from the target outcome. This control process can be different based on the type of business. But in case of design this controlling tools are prototyping and testing. So only by that process and the feasibility of implementation. By that process it can be controlled, the idea can be finalized and it will lead to the target outcome.

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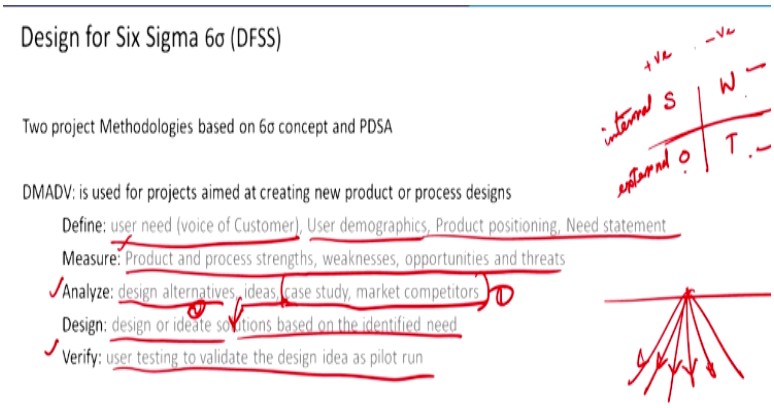

The next model which is quite similar and which is just the domain is different. So which is used for a project aimed to creating a new product or process of design. So this is more related to the design process and based on the design domain only because of the domain few of the terminologies or the names are slightly different. First is define then measure, analyze, design, and verify.

So first defining the user need voice of customer again based on demographics and product positioning and need statement which is same. And then measuring is product and process strength, weakness, opportunities and threat or the SWOT analysis. So that you must have studied this process of analysis which is called strength, weakness, opportunity and threat. So these are negative points and these are positive points.

And strength and weaknesses are within the product which is the internal qualities and this is external quality. So opportunity and threat can come within the process. So when we are implementing the process or designing website so what are the opportunities, the technological advancement are the opportunities. So whether the idea can be implemented through the technological advancement or the efficiency of the employee.

Whether they can quote that, whether they can program that, so that is opportunity threat. In overall process what are the different threats. It can be monetary threats. So these are the process related or the external broader problems and a positive and negative sides which is opportunity and threat. And internal is the strength, strength of the product. If we create the product what is the strength and how it can cater to different target audience.

Whether it can enhance the set of target audience if our existing product only caters to few people, the new product can it cater to more people? Or maybe in the existing product people are already, the existing product idea what are available in the market. People are not happy with that. So if we change or create something new whether more customers can come within that. So that is strength of the product.

And the weakness is what might be the probable weakness? There can be many technical issues or for certain reason the product might not create put all the options within that particular website which might create confusion or which might create more clutter or it might enhance the budget of the product. So if we cut down that so what can be the probable weakness of the product and how the product might fail.

So it is not the process level failure, it is the product level failure. That is the weakness. So this SWOT analysis is part of one of the process of measuring the concept. So there can be other options, other processes. Different other, designers can go for different other ways to measure this and SWOT analysis is one of the mostly widely applied process. Then analyze.

Analyzing the design alternative or first creating the ideas and analyzing the potential alternatives and giving their different ideas and also the case studies and market competitor based on this analysis also happens. So this analysis actually happens first and then the second process. So first we do multiple different options, cases where other similar products are there.

So we do study that and then we analyze how they are performing well or how they are failing, why they are failing because of this and based on the market competitor. So few market competitors will be studied and that is part of a case study and what is their strength and weakness. And against what analysis can help to understand the study and then based on that the next stage is the ideas and creating alternative, different ideas where we are again diverging in the next stage of the diamond which is the finding the right solution.

So now designing or ideate is the process where we are starting prototyping or we are freezing the design and next level of ideation and we can put the ideas over here and then the verify is user testing or validating the design ideas or through a pilot run or user testing. So there we are again converging to a particular idea based on the user testing and negating other and deleting the other ideas which will not satisfy the user need.

So this is again the similar model based on the Six Sigma process and in the next class we will start discussing about the detailed process of the design.