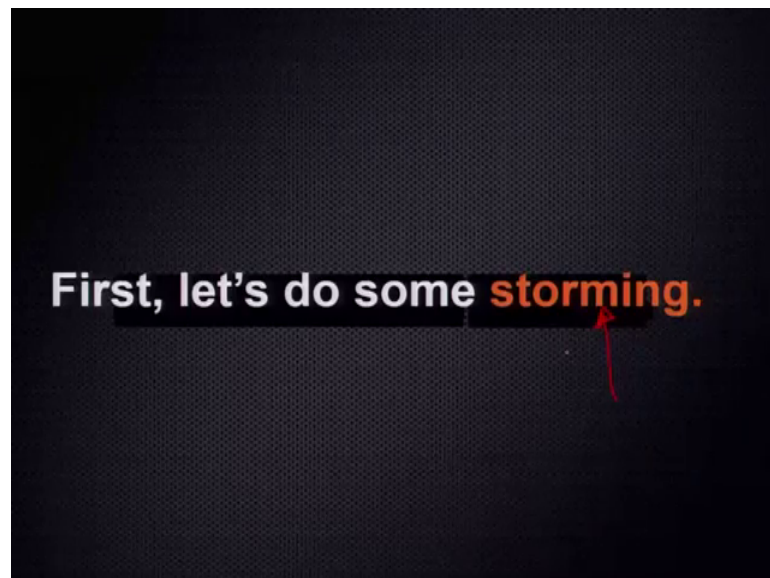


**Design Practice**  
**Prof. Shantanu Bhattacharya**  
**Department of Mechanical Engineering**  
**Indian Institute of Technology, Kanpur**

**Lecture – 05**  
**Brain Storming**

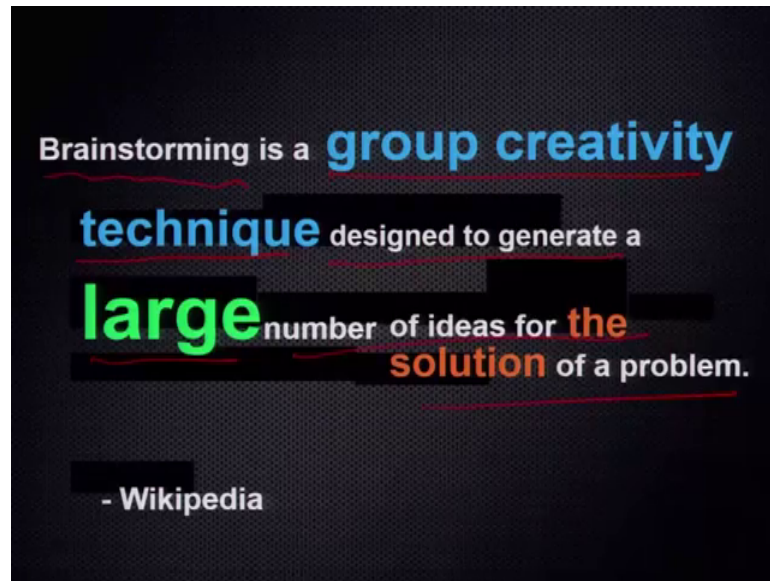
Hello and welcome to this design practice course module 5, we were talking about brainstorming and we were talking about some basic rules associated with brainstorming, we have already in the prior step sort of gauged and formulated set of people together which we can call up a t shaped team.

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So, let us actually start doing some storming. So, what are the modalities associated with brainstorming? You have to really follow some rules if you want to do a proper ideation through brainstorming activity.

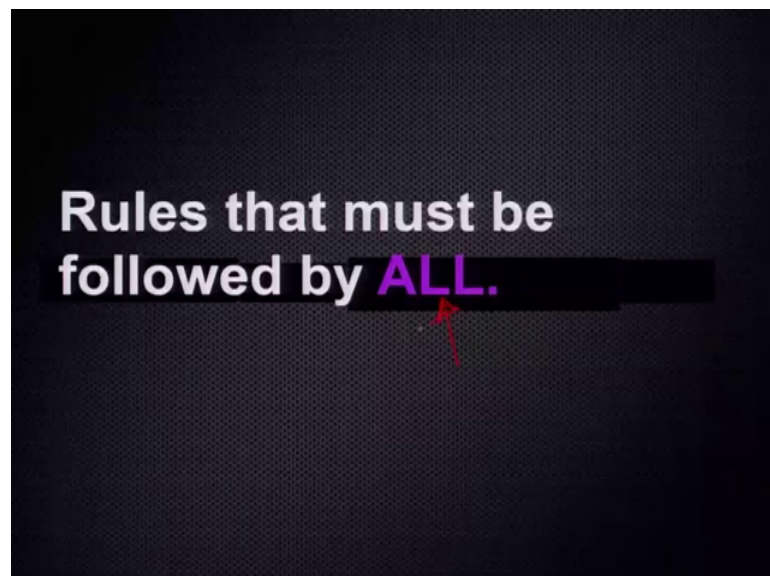
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And if I looked into the definition of what really brainstorming is. So, brainstorming is defined according to Wikipedia as a group creativity technique designed to generate large number of ideas for the solution of a problem ok.

In case it can also be for a solution which exists and which you are trying to find out which so that there is a need which emerges based on which there can be a product solution ok. So, both ways you can do and cover up; through you know brainstorming for all the idea generation process.

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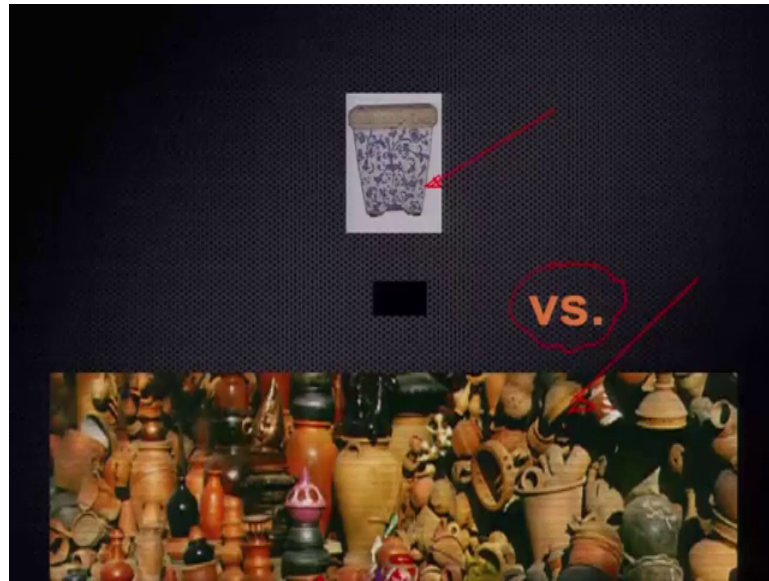
So, what are the rules that must be followed by all who are involved in the brainstorming process? So, there are very very specified protocols which you must follow philosophically if you want to do this right and do this very straight.

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So, the first rule that one has to really obeys go for quantity, you do not have to care really at the first instance while doing brainstorming about what you are discussing; you discuss all wild thoughts focused on the subject of course, but go for as much as possible and as many variations even if there is a stupid looking idea get it on board and record it somewhere. So, that is the first rule for quantity which can be again illustrated through this ok.

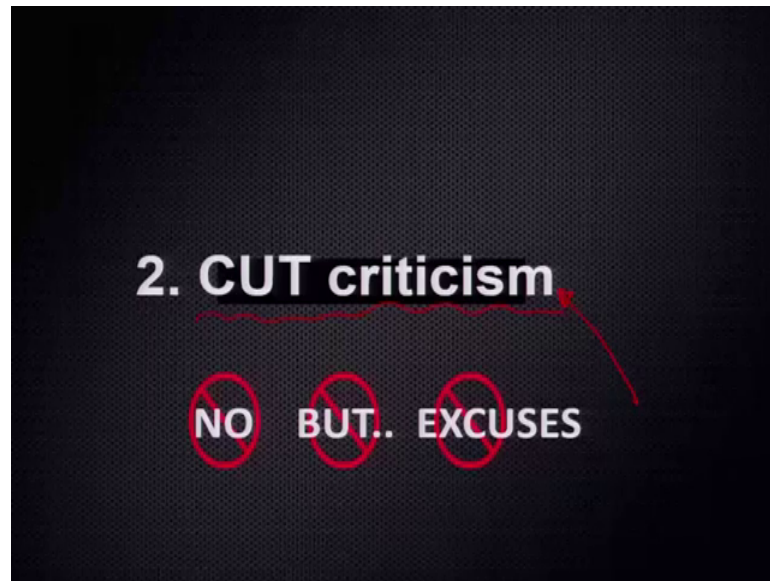
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So, you are not going to do this particular beautiful pot ok.

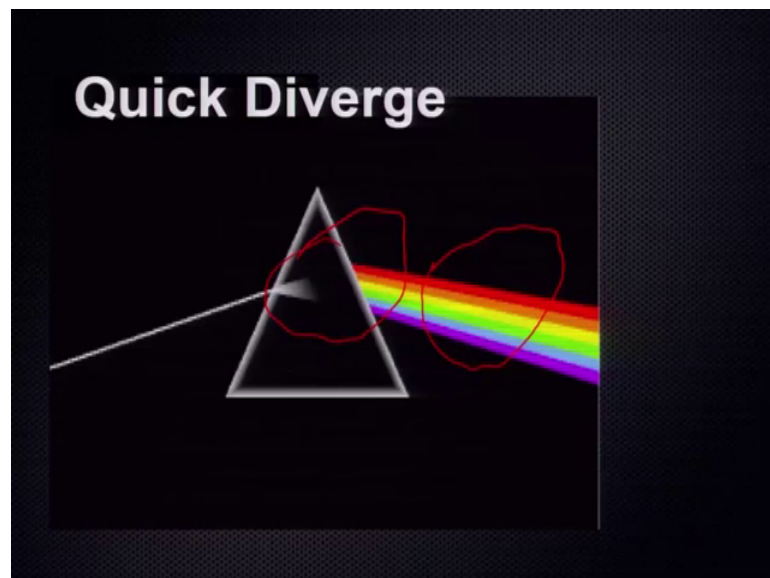
But a set of pot trees you want to generate. So, that from here you can pick and choose what is good at you in the process, you do not you make sure that you do not leave anything which is there in the horizon somewhere and somebody thought of it, but probably it had a better solution, but it never got into because it was not good looking ok. So, you have to be very very careful about this one step that generate as many ideas as possible to begin with so that, you can have you know you can go for the big idea or the big innovation.

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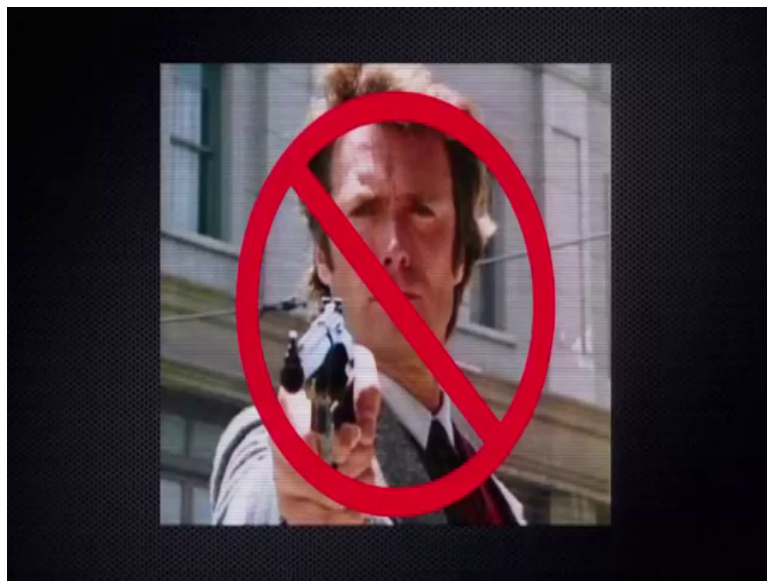
The other most important rule that one has to follow if you really want to do a good plane storming session is to cut all criticisms. So, there should not be any no or, but or excuses. So, you basically try to be very positive towards listening rather than saying it loud, when somebody else is saying it ok. So, you cannot criticize at the very beginning to kill an idea as its generated. So, leave your ego completely separate if you want to get onboard to generating positively as much ideas that you can.

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So, you cut criticisms and then once a lot of ideas have you know have come up and you need some more you have to be also able to diverge quickly. So, basically whatever you have been doing in your brainstorming if you see that the group is really going into a certain direction as well as a natural leader the goal should be to go into completely different directions. So, that the group can be set in that direction accordingly and then generate as many directions as possible. So, that you can go out spread in an out spread manner from the basic path of that that a group a otherwise be following.

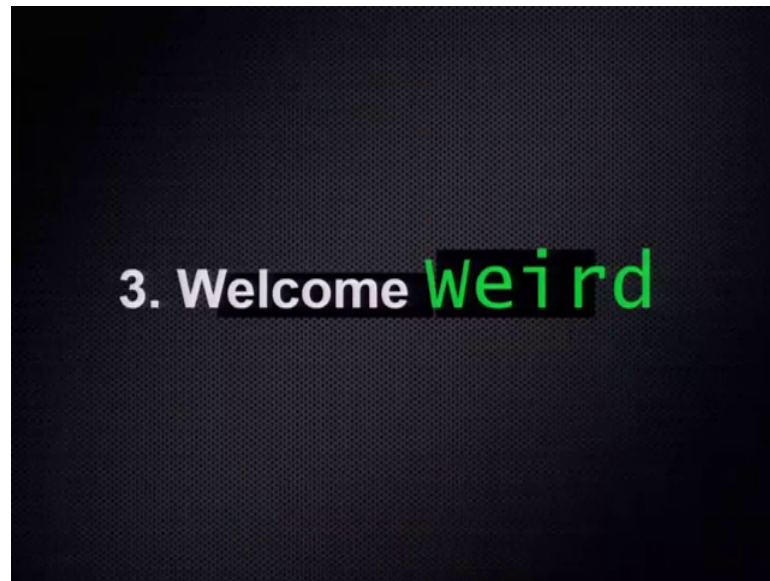
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So, quickly diverge cut criticisms and quickly diverge and the other issue is that do not shoot at each other's ideas.



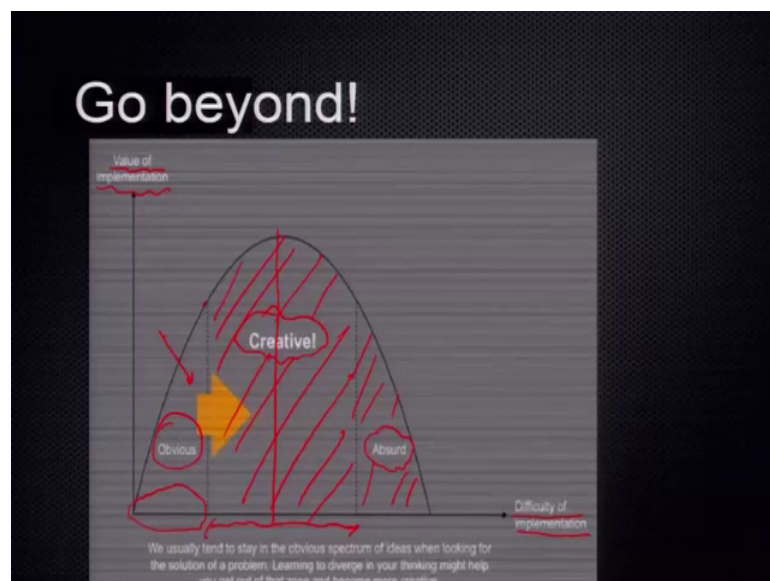
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So, whatever ideas are getting generated, you should be able to welcome them. So, typically all weird ideas which probably may not at the first instance make sense also need to be included in the brainstorming.

So, welcome all weird ideas as well as all other ideas which are generated and then this you.

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Know approach needs to be realized that when we talk about the parameters namely value of implementation of an idea and the difficulty of implementation at the idea there

is always a tradeoff. So, there is of course, a obvious where the value is reasonably high, but then the implementation difficulty may not be that high, and so, this is the obvious as a thought process is a natural intuitive thought process for everybody, who participates towards making a solution.

But you know what is creative is that non obvious which is away from this domain, where the difficulty of implementation may be slightly higher, but you will have the maximum returns or maximum value of implementing a certain idea ok. So, this domain is what one has to go for and for that you have to really be open to this idea generation process.

And so, once this particular domain is sort of all explored there is of course, one more domain here which is the observed domain, where the difficulty is very high or the value is low so; obviously, it will cut itself off, but that does not allow us to not generate ideas in this domain as well. So, the idea should be generated probably where the value of implementation is high the difficulty level is relatively low or where the difficulty is slightly higher and the value is low or value is very low and the difficulty is very high, but still there exists an idea. So, all these ideas need to be taken forward for the whole brainstorming process and the idea like generation to work out well.

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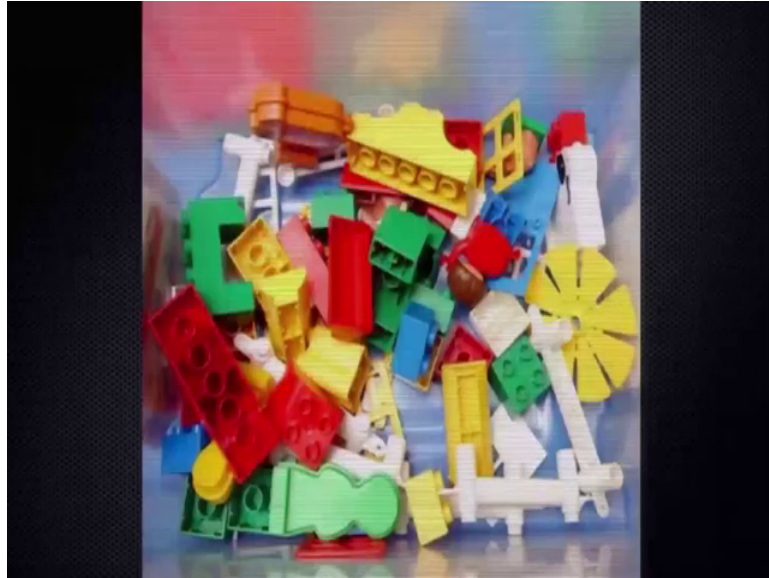


**4. Take ideas further.**  
**Build & combine.**



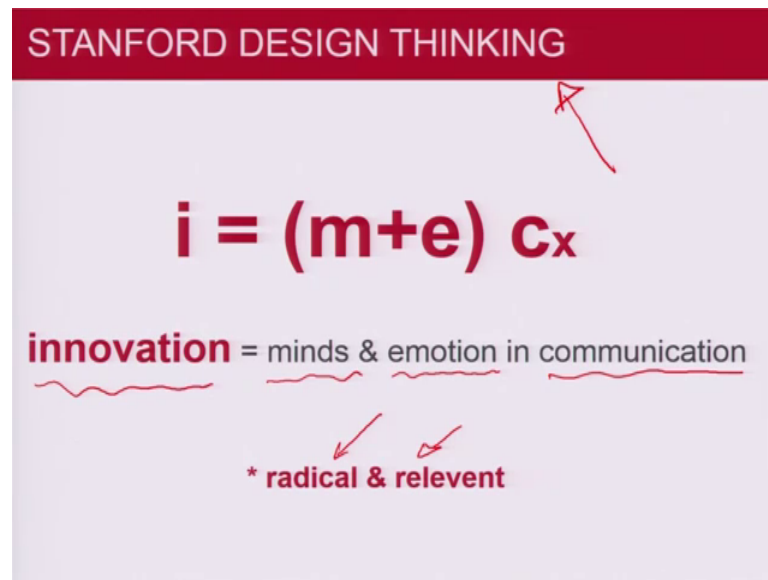
So, what do you do is out of all this is to sort of build the idea rack, based on all these ideas which have come up to define a problem statement or they find a solution for an existing problem, and then you try to build and combine ok.

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So, basically the ideas can be able to combine together or the ideas can be able to take different directions on the same alternative that would be finally, generated as the best possible design, but the idea is it is like a big jumble now, and then from the jumble you have to create an organized way of starting to assemble and so, that is what also matters or a brainstorming session to be complete in its in its due form.

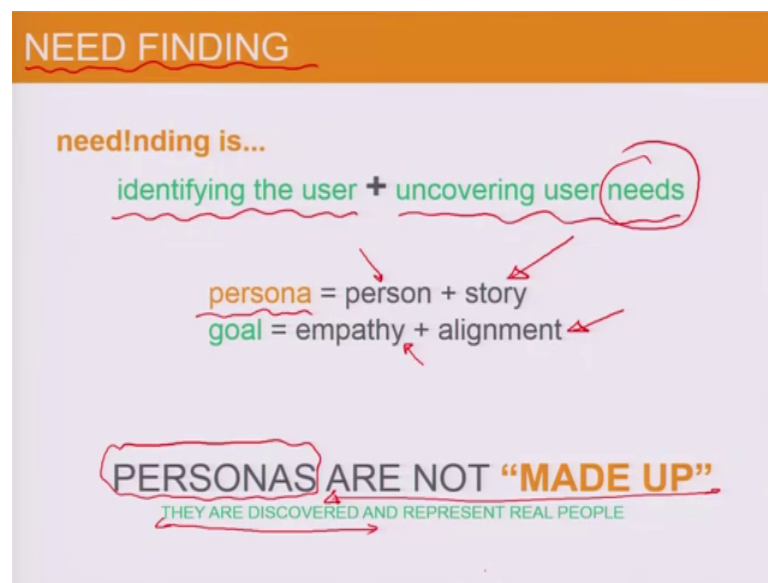
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So, the process definition says you know and this is what the whole design thinking process the Stanford design thinking process is that, an innovation crops up when there is there are minds working together, there is an emotion involved in solving a need or a problem or even emerging a problem and they are continuously in communication with each other. So, basically there have to be a human factor, there has to be a proper pathetic behavior of the human factor towards situations, problems you know stories.

And then choose ideas which are the most radical and the most relevant and then you have to communicate you know the minds have to communicate with each other in such a situation. So, that innovation can come up or innovation can be generated. So, I think I have kind of given enough philosophy behind this whole process.

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And the underlying you know need finding, which is actually an important pretext whenever we talk about starting to innovate is about again people right. And so, people are called personas, personas are actually not made up they are real people and they are people who are existing in a certain situation they are discovered, they because of the situation that they are in and then you have to actually think about that person and think about a story which exists because of which this person ok.

And the goal here is that the moment that person and the persons stories get that unraveled, you have to be empathetically trying to align the design requirements or design goals towards some inherent needs, which you will find out while identifying the user ok.

So, his needs which are actually not even known to him fully may have to be emerged by you as a designer, while talking to the person or creating a story behind the person and so, this persona mapping is a is a very very important issue and probably step 1 for doing the need finding behind any design thinking process ok.

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So, let us look at this particular picture which is on board here, and this was an assignment again done by a group of students with us, which talks about a person right here and various situations that this person is in you can see different situations different photographs associated with this person's life, and you know the first example of doing something is to sort of identify a persona and a story associated with these set of pictures ok.

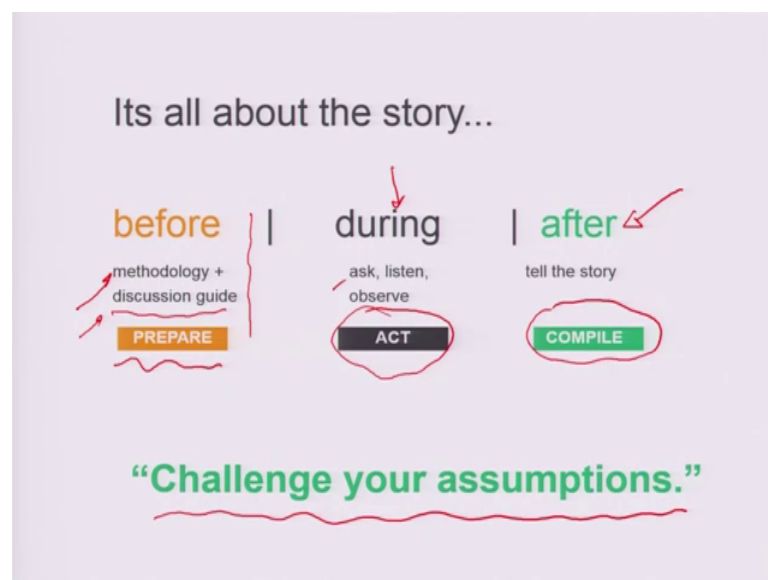
So, the job here is that the themes that you have developed in the earlier stage should typically get together look at this picture ah, and do not go for any forward on the video and try to generate a story behind this person. In our case some of the students interpreted this poor guy here as a farmer, who manages to have cell phone, barely you know does get to eat whatever basic food he is available and he has not a very good lifestyle, because he has a broken cycle as you can see here in an his home.

But then and then there is you know the home is also not so, well to do, because it probably has a damaged roof or even a place where, probably there is a lack of doors and windows as you can see in the in the particular building here right here and so, he is typically in a realistic setup, but his aspirations are very high. For example, he wants to get a smart phone, probably he wants to get sort of a very good quality shoe for being able to wear and do something maybe ride his bicycle or something.

And probably wants to by looking at the age of this person, he is quite old. So, get his children settled and married and so, the story built up around this image by a group of students was that this person right here is in a very poor state ok, but he aspires to achieve some things. For example, get his daughter married or buy a shoe for himself or buy probably a cell phone and for that, he decides to participate on the race bullock race and jeopardizing probably this his safety also, but because of need for some of the things in the slide he still decides to go and participate in the race even though it may jeopardize overall safety and there may be a possibility of injury etcetera.

So, this is a story built upon this persona through which you could actually try to map some of the inherent needs that this person has for which you could develop solutions and for example, in real life when you are talking to people, the first thing you must try to understand is to watch from a distance about the situation that a concerned person is, and try to create a persona out of that person practically empathetically with by aligning yourself to that person's shoes and trying to see what would be the general thinking. The general requirement of a person who would be in that situation out of which you would now try to generate an idea right behind the need of a concerned person.

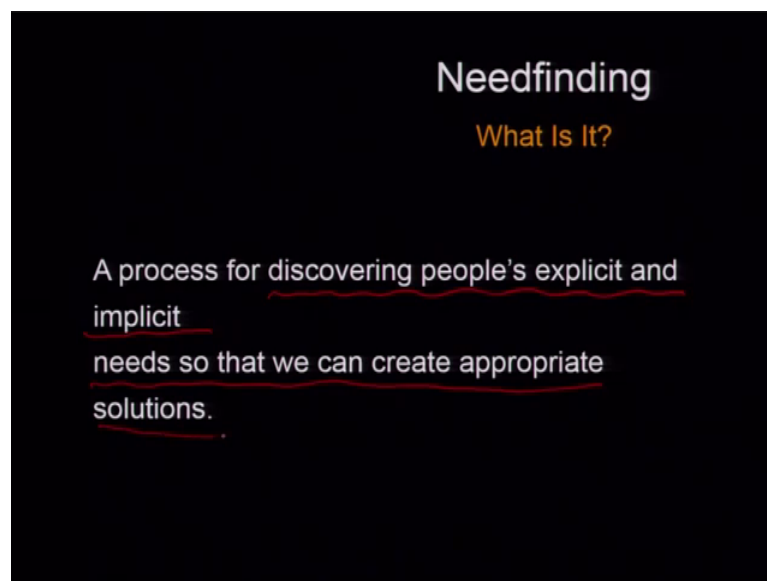
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So, that is how you know the story goes, that you have to prepare before. So, you have to put a methodology in place to gauge what is important prepare some kind of a discussion guide, through which you could actually talk and interact and then once you start

interacting with the concerned person, you should listen and then ask observe again ask and so, you have to act you know on that account, and later on prepare a whole story which you compile based on your observations you know during the during the whole process of discussion with a concern ok. And at every step you must challenge your assumptions and try to move forward so, that you generate a very very new story and folded which otherwise was probably not even there or not even existing intuitively associated with such a persona.

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So, once that is achieved. So, you are basically discovering the people's explicit and implicit thoughts what are these? We just come back to you I mean in just probably the next few slides about what is an explicit and what is an implicit thought our needs and these are important because you want to generate appropriate solutions to these particular needs.



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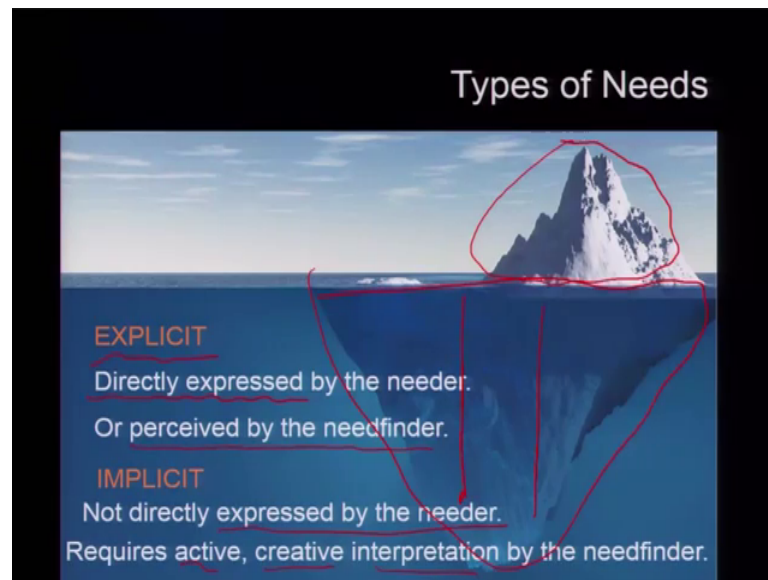
## Distinctions For Needfinding

- **NEED is a VERB**  
A physical, psychological or cultural requirement of an individual, or of a group of individuals.
- **SOLUTION is a NOUN**  
An object, action or process that satisfies a need.

And for need finding there are certain distinctions that you want to make. For example, you want to ask a question where the need can be a verb and the solution can be a noun for example, need could be a physical psychological or a cultural requirement of an individual or maybe a group of individuals.

So, the solution is basically an object you know it could be an action or a process, and it would satisfy this physical need for some verbs or something, which is you know an aspiration related to an individual ok. So, that is how you can sort of classify the need statement or make a need statement based on that.

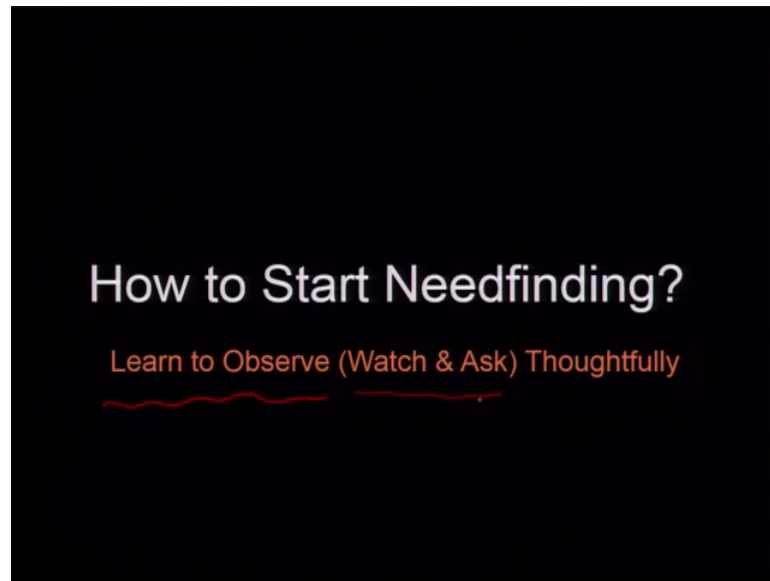
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So, as I told you earlier these could be explicit or implicit. So, if you look at this iceberg particularly there is a huge portion of the iceberg which is still under sea and not visible, but they do exist ok. So, needs are like the situation where when you visualizing here is probably those which are not even important whereas, the real need probably may lies somewhere underneath.

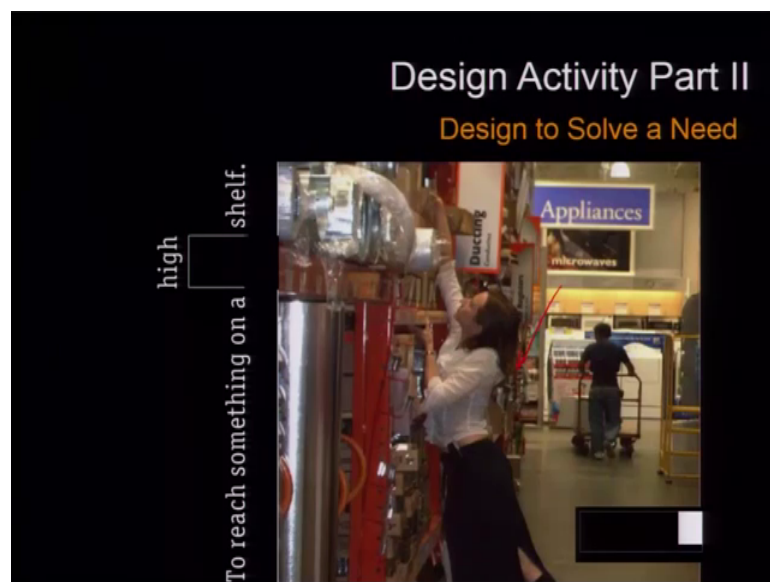
And so, therefore, you need to be able to explicitly see or directly things which are expressed by the needer are perceived by the need finder, but beyond that you also want to see what was not expressed by the needer directly. Just based on your intuition try to actively or creatively interpret whatever is need finder has elaborated in his interview ok. So, that it would involve that in the persona story so, that a general need can come up. So, that is how you will try to go underlying try to go to decipher the underlying psyche of an individual based on which there may be a need.

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So, how to start need finding? So, one thing which is very important is to learn to observe watch and ask many times and observe very thoughtfully what is there in a situation.

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For example, what do you see in this particular picture here ok. So, and what do you interpret about this picture. So, some of you may think that this is a probably you know a warehouse, where various products are kept you could read appliances here, you could read microwaves, you could actually see these folded sheets of steel or plastic whatever

kept. You know, but then we need that you interpret here is basically a requirement for something which would reach you know on a high shelf. So, probably that is the most difficult part in this picture that you are not able to reach a material which is highly placed you know if which is placed on a higher rack or a higher shelf, because you do not have some kind of a foot ladder or something in place.

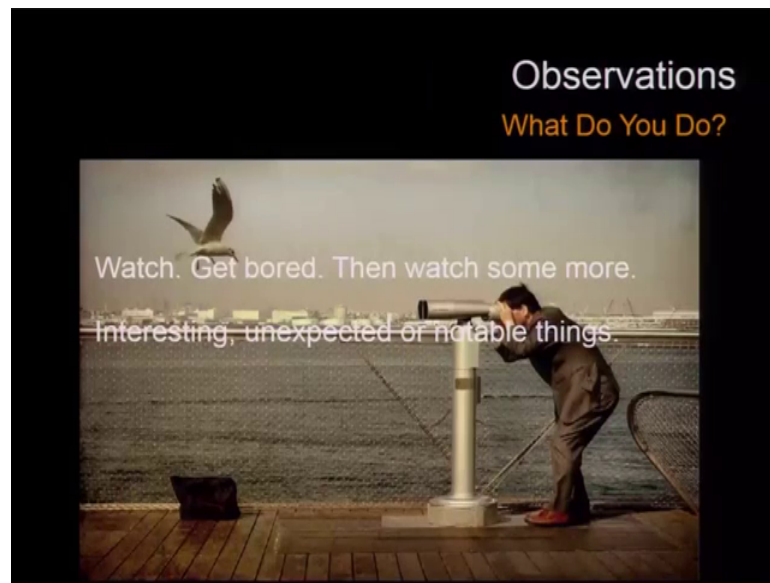
So, the first need that you could solve from this situation is to think about or start thinking about a new product here from this situation that about it a foot ladder something like this.

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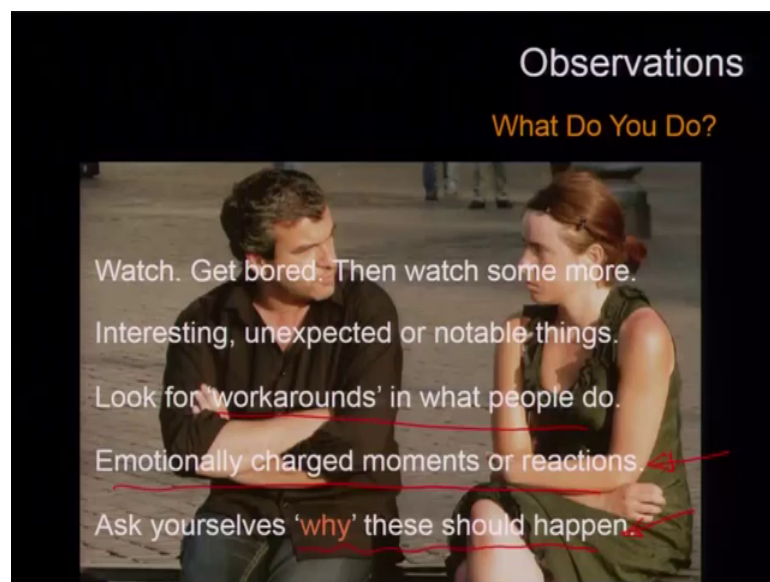
So, this is how you basically start interpreting from a real life situation, when you want to unfold the personal story behind that situation and to create you know your intuitive process to think of solutions at every level of you know observations which you feel can be needed by individuals working within that set up.

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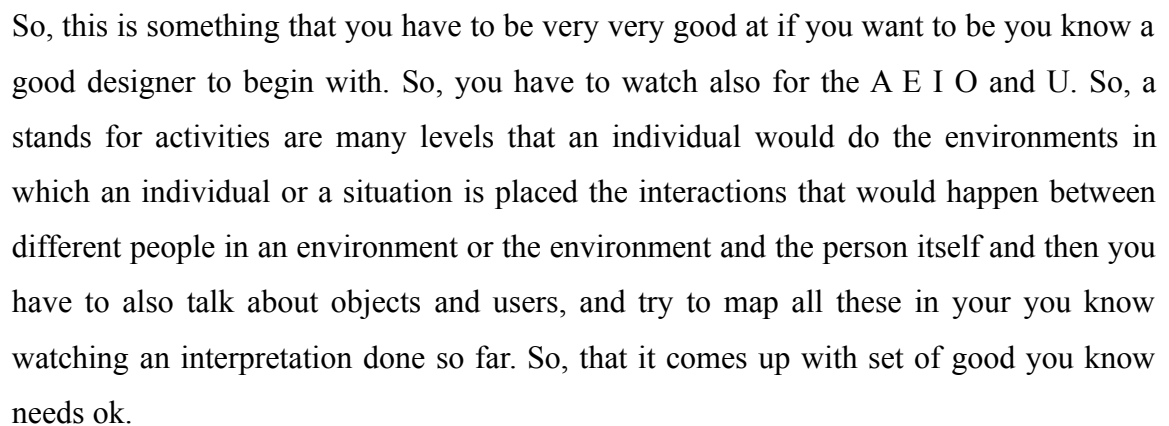
So, the basic rules of the game are that watch get bored and then watch some more ok. So, there may be some interesting some unexpected or notable things, if you continue repeating this process again and again.

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The other issue which is very important is that again you should look for workarounds in what people do or emotionally charged moments or reactions of different people would be able to help you to understand some of the pertinent questions related to why they should happen, maybe that may be a cause of an underlying need which may be in place.

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Which are underlying even explicitly said or implicitly hidden it does not matter, but then you have to be able to interpret.



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Observe and Ask

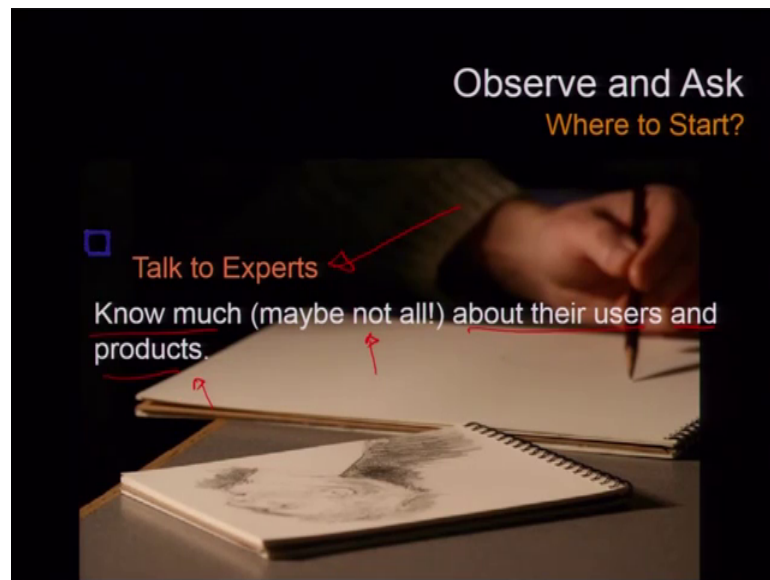
Where Do You Go?

- Go where your USERS are
- Most useful if you know who they are (!) and where they go.
- Go where the ACTION is
- Maybe you start with a location, and observe what happens.

So, the first act that you have to do here is to actually go to the users yourself. So, you go where your users are and it will be most useful, if you know who they are actually before going even. So, you have already mapped something related some perceptions related to the concerned user and also you have some information on where they go.

So, that this will help you after observing and talking to them to interpret various things, which may be underlying which, they may not be able to know themselves, but unintentionally they are spelling it out for you to decipher or discern. So, go where the action is maybe you start with the location and observe what happens there, and then start observing and asking yourself where is that innovation which is in place which can bring out something wonders.

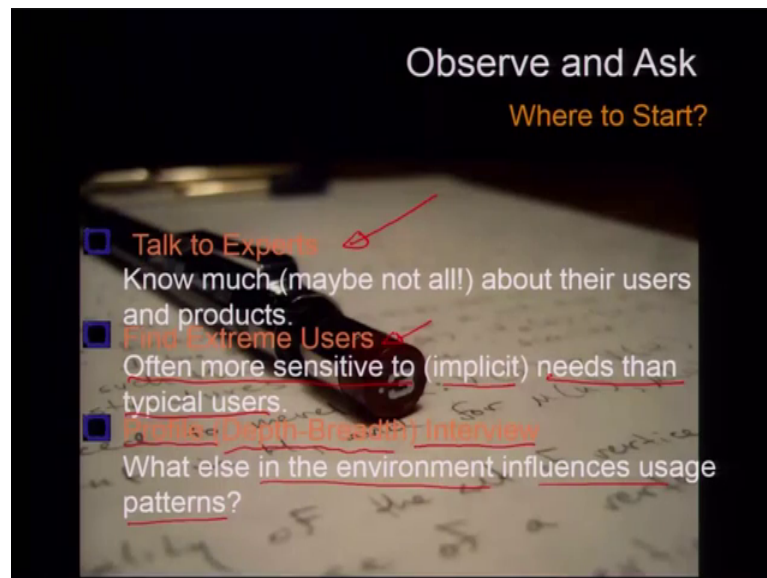
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The other very important part here is to talk to experts. Experts do know much maybe sometimes not at all because they are not an expert, but are claiming to be an expert ok. So, experts do know about their users and products. So, therefore, talking to some experts who are really experts in the business would help you to gauge the observations, that you are making continuously and asking yourself to go to the next step in order to refine the observation ok.

So, some knowledgebase would really be helpful at this particular stage, you know what is existing where you do not work or what is not existing where there may be an innovation ok.

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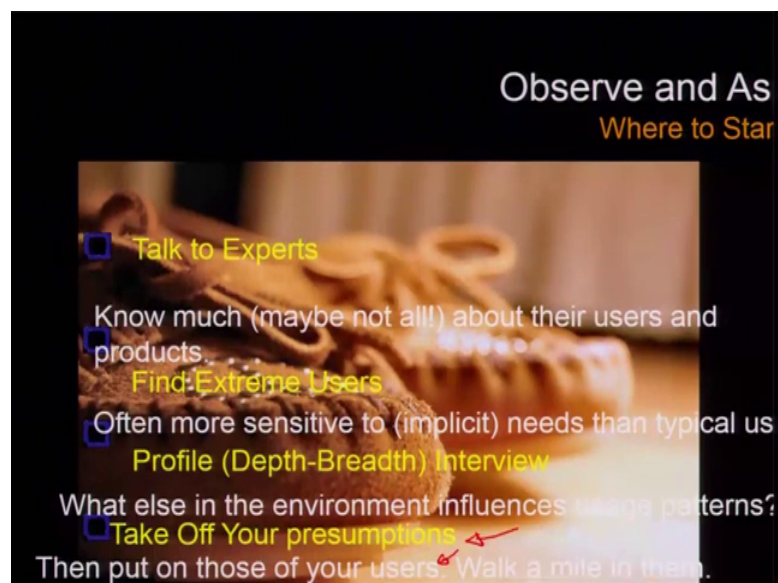
So, you talk to experts and maybe find extreme users; extreme users are often more sensitive to the implicit needs the hidden needs than the typical users, but getting such expertise is sometimes difficult because then a person would interpret about philosophically being able to use a service or a product, rather than just giving the direct consequences of using it ok.

And then you basically do a profile interview, where you take a both the depth as well as a breadth about what else could there be in the environment, which may influence the usage patterns about what the users are thinking to be a potential product where they could actually start. So, this is what again needs to be done when you are talking about developing the need step or the need finding step.

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## Observe and As

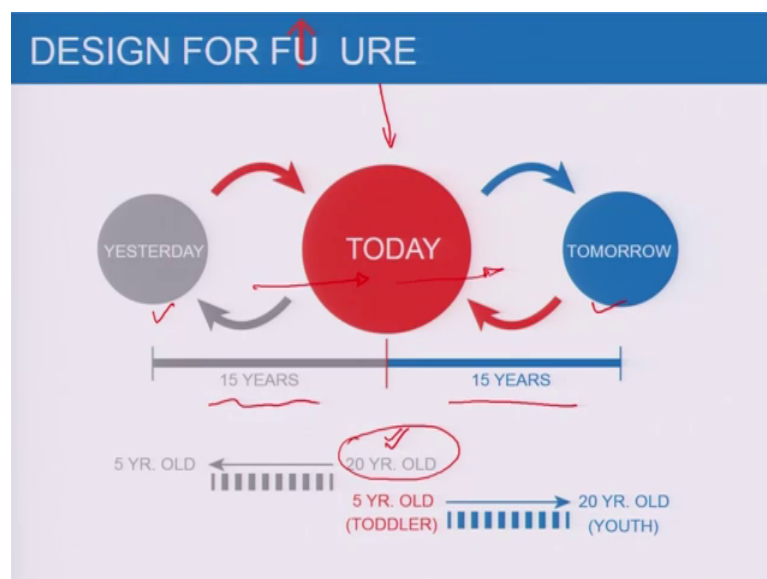
Where to Star



- Talk to Experts
- Know much (maybe not all!) about their users and products.
- Find: Extreme Users
- Often more sensitive to (implicit) needs than typical us
- Profile (Depth-Breadth) Interview
- What else in the environment influences usage patterns?
- Take Off Your presumptions
- Then put on those of your users. Walk a mile in them.

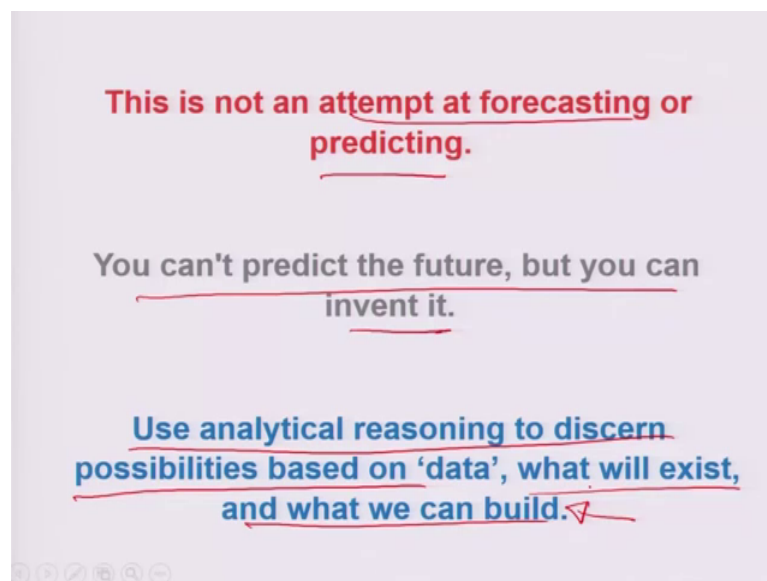
And then take off all your presumptions, you know about what you have interpreted so far, and just walk in your users shoes and walk for probably a mile in them yourselves to find out what could be a underlying need you know of a person in a certain situation. So, there is a person there is an emotion connected with the person there is a situation and you as an observer are trying to just observe and absorb as much as possible by experiencing you know the concerned user.

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So, the whole goal here is to really design something for in the future. So, you have to keep both the yesterday and tomorrow and purview when you are trying to design, because you know this is today's design which would definitely try to go along for quite some time and it must have been borrowed on the experiences from what was before. So, you design on almost a 20 year old span with 15 years on either side of what you are in today. So, that your products may be as futuristic as possible, but borrowed from experiences from the yesterday years.

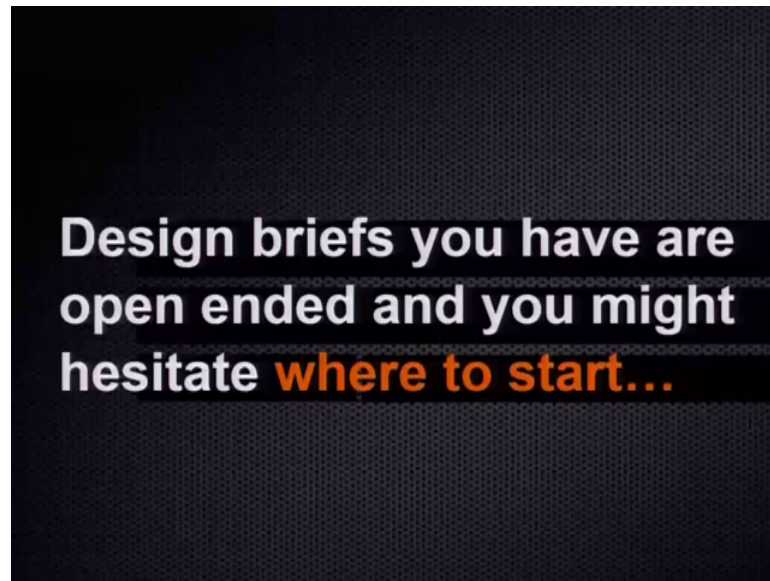
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So, that is what the goal is when you want to develop something. So, it is not really an attempt at forecasting or predicting it is that you can predict the future, but you can invent it, you can make your innovations in a manner. So, that they continue and do not fade out for a longish horizon of time ok.

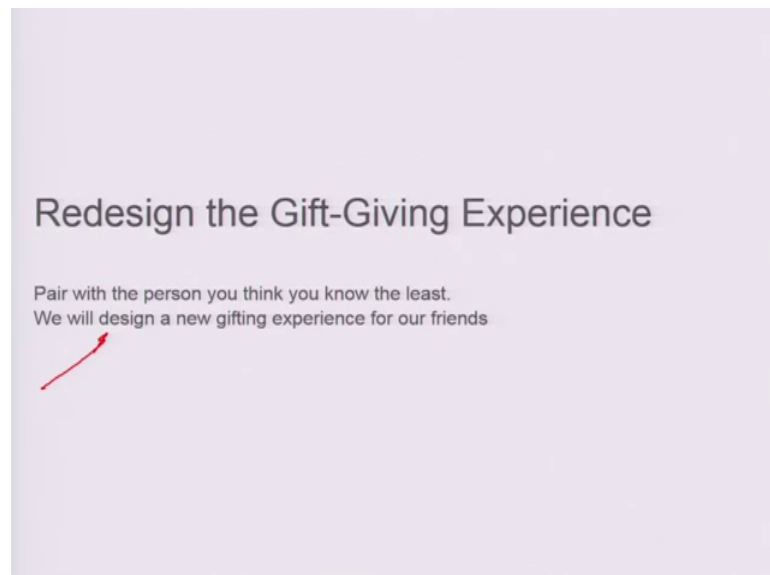
So, you use analytical reasoning to discern the possibilities based on data and what will exist, what we can build and finally, go to that level where you can say that yes there exists this underlying need for a certain product, and this is because there is a certain verb associated with the user which promotes this particular need to come up or exist ok.

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So, I would now like to give you small activity and then probably, I will share a few responses that we had done when we actually were working with our students here. So, as you know the design briefs you have a quite open ended, you might hesitate where to start and the best way to do it is to redesign what you call the gift giving experience.

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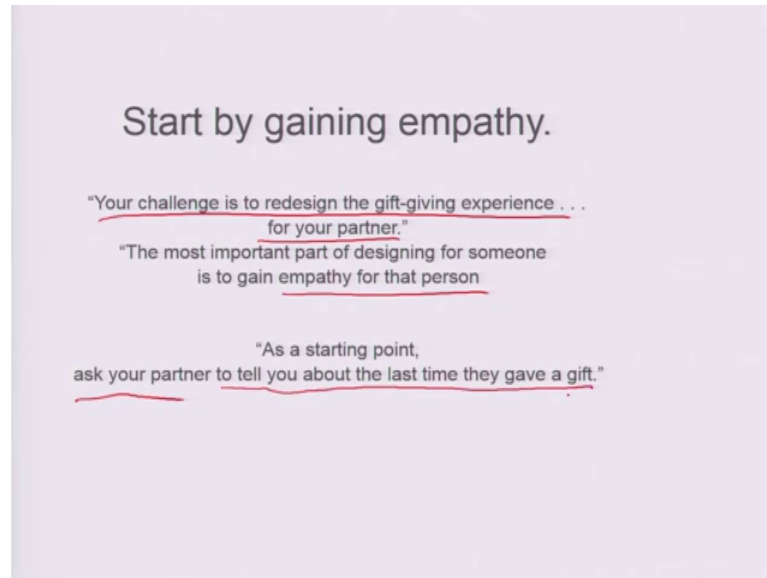


So, in this activity I would request people who are taking this particular class to pair with people whom you think you know least ok, and we will all together design and you give giving experience for our friends. So, I am going to now go step by step of what you



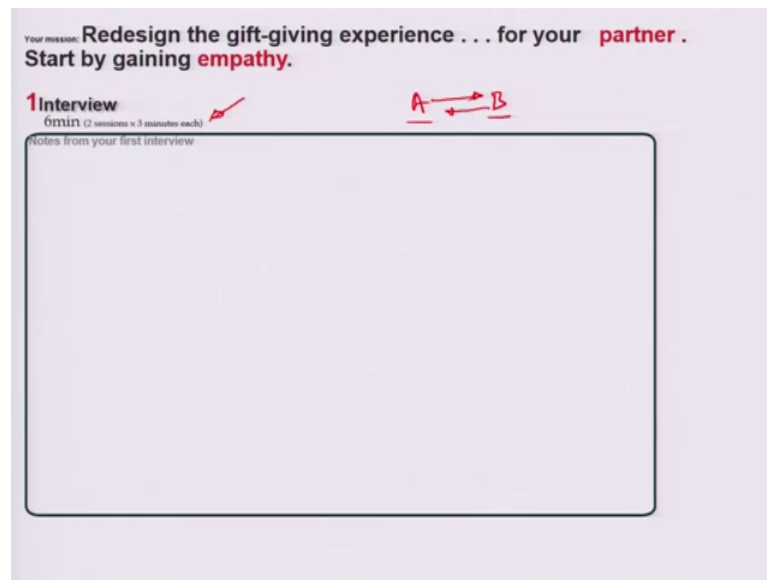
want to do, and then I would request all of you to stop here and do this activity yourselves and then you know I will also share with you some of the data that I had for a group of students that I was working in what their responses are at a later date ok.

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So, in this particular case you will have to start by gaining empathy of your partner. So, your challenge here is to redesign the gift giving experience for your partner. The most important part of the designing for someone is to gain the empathy of that person ok. So, you have to listen more and talk less. So, as a starting point ask your partner a question, you asked you hear ask him or her to tell you about the last time they gave a gift and what kind of aspirations, they have when they start giving gifts to people about planning the gift ok.

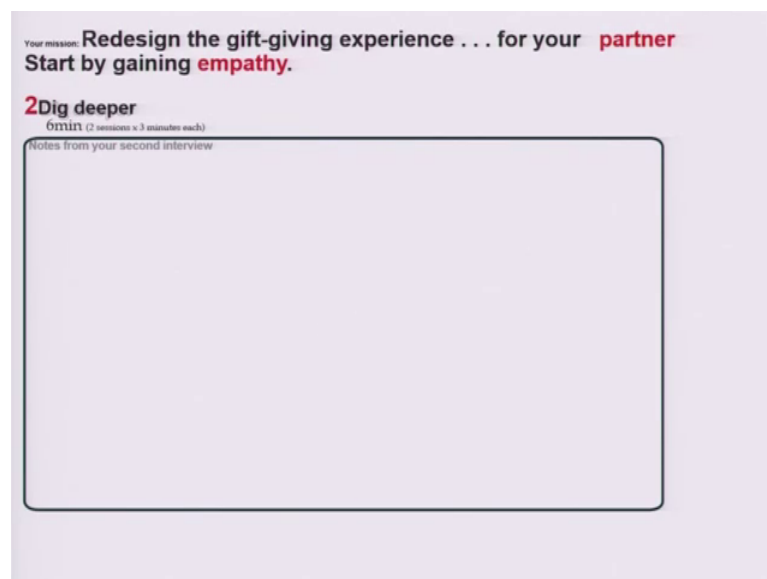
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So, this interview should be recorded and so, there should be typically either. So, basically if there are A and B two people. So, in first case A should interview B, in record and in the second case B should interview A and then record ok.

And then there are certain stipulated time frames, which are given in which you have to collect the notes from your first interview.

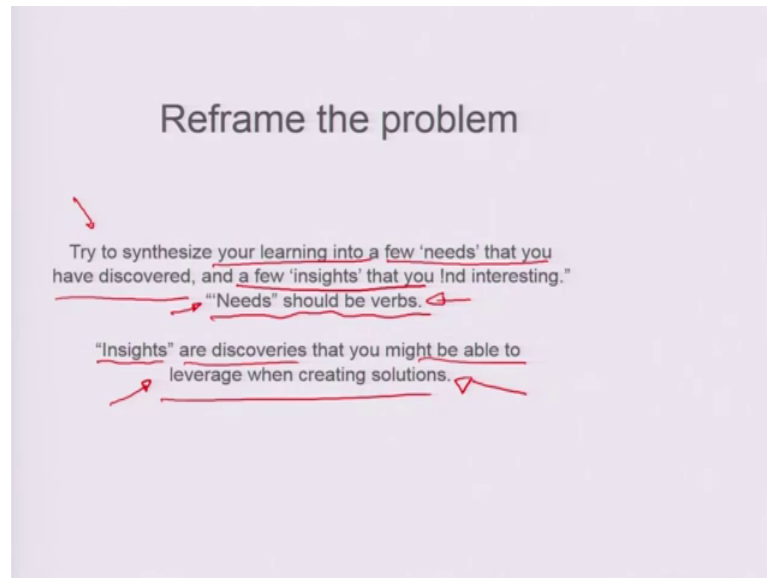
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In the second step you basically dig a little more deeper and start asking a little more insightful questions based on the first approximation of the first response that your

partner is given, do repeat this for both A and B as I have said before and map this in this particular format ok.

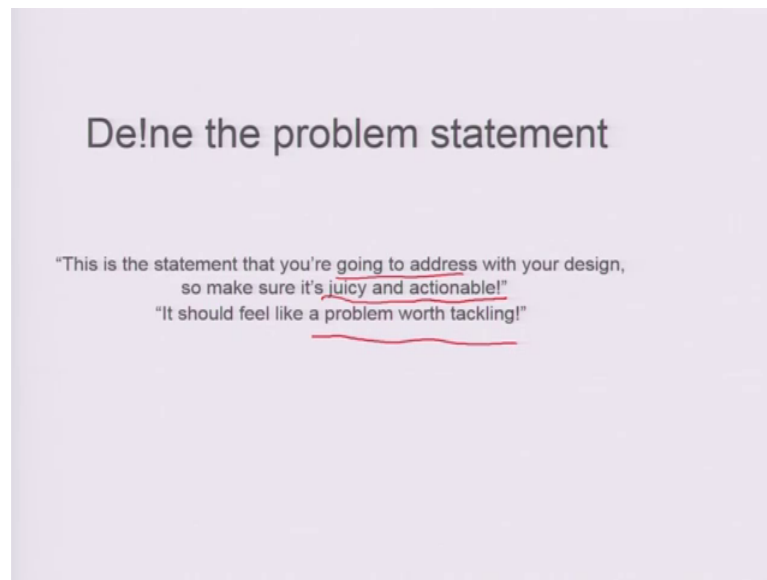
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And then you reframe the problem; reframe the problem by trying to synthesize your learning's what you have by the interviews into a few needs that you have discovered within the partner with whom you are working, and a few insights that you probably find interesting. Mind you need should be verbs for example, person likes doing something like likes riding a bike or let us say rights photography. So, these are active verbs which are there and then the insights that you would like to make as designers are discoveries that you might be able to leverage when creating some solutions ok.

So, then a lot of needs can get pumped I mean clubbed up together and you know the idea of generation process that from a jumble you have to build a design. So, how will you design in that manner ok. So, you reframe the problem and define the problem.

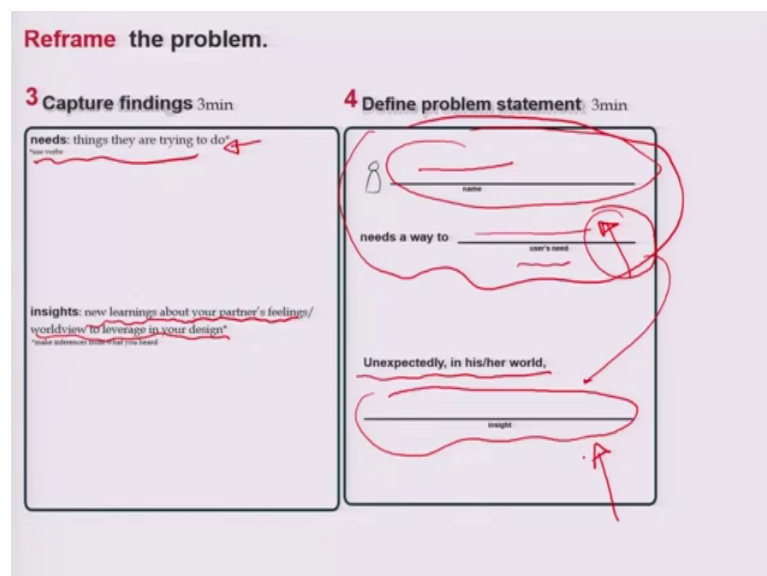
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So, this is a statement that you will be actually go addressing in the future, while you do the final you know design brief that you will be giving your partner to ask about his or her opinion ok.

So, the statement that you are going to address with your design should be juicy and actionable. So, it should be something where you know the inherent needs the underlying needs of a person should come out, it should feel like a problem which is worth tackling which is already not there on the market. So; something which is full of innovation.

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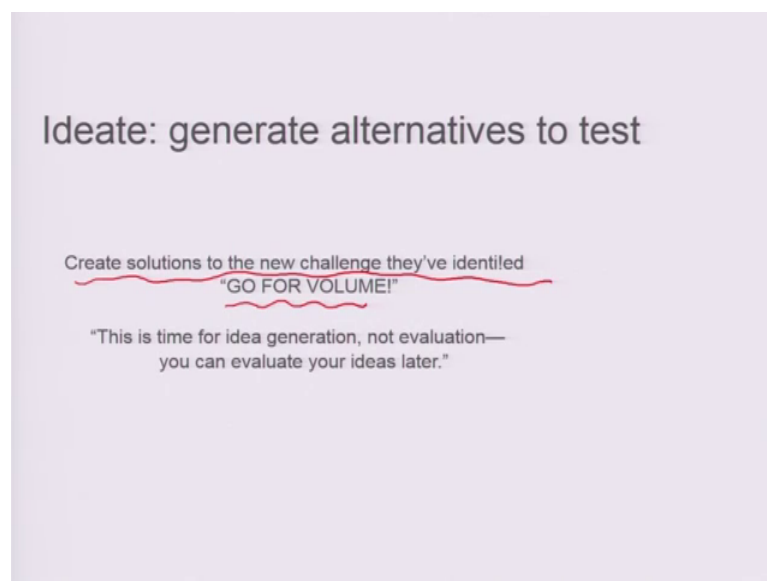


And in these you will have to capture findings again by understanding on the needs which are things that they try to do; that means, your partner tries to do most of the time and the insights which you gain by talking and sort of try to find out the implicit or the hidden feelings that your partner has, and give a world view to leverage those feelings somehow to map into your design.

And then you want to make this action statement here which says that so and so, write the name of your partner here needs a way to do something which is actually a verb here map this, and then unexpectedly in his own her own world you basically give an insight that the reason why he or she wants to do this is because there is some aspiration which is at the back of the mind or there is some event which happened or there is something, which happened back in time you know because of which this need arises ok.

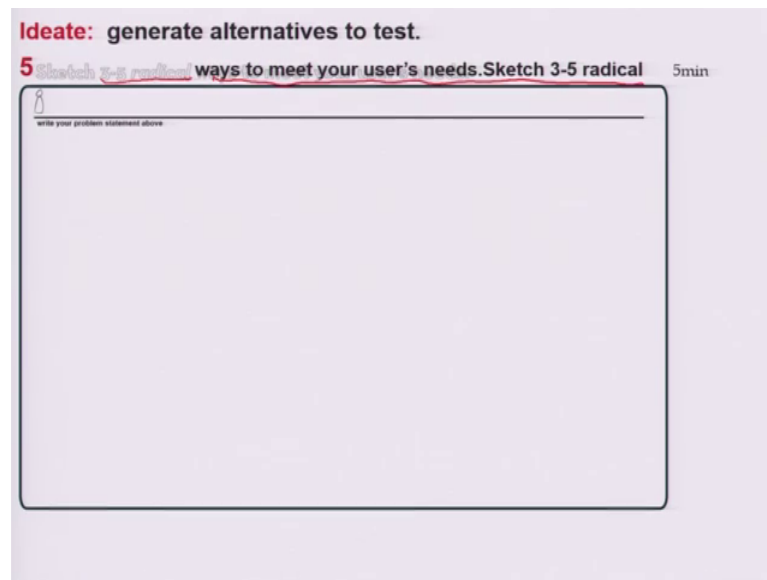
So, this would give you a sort of a feeling of how to map one's mind. So, do this activity very diligently and then finally, you would generate an alternative to test.

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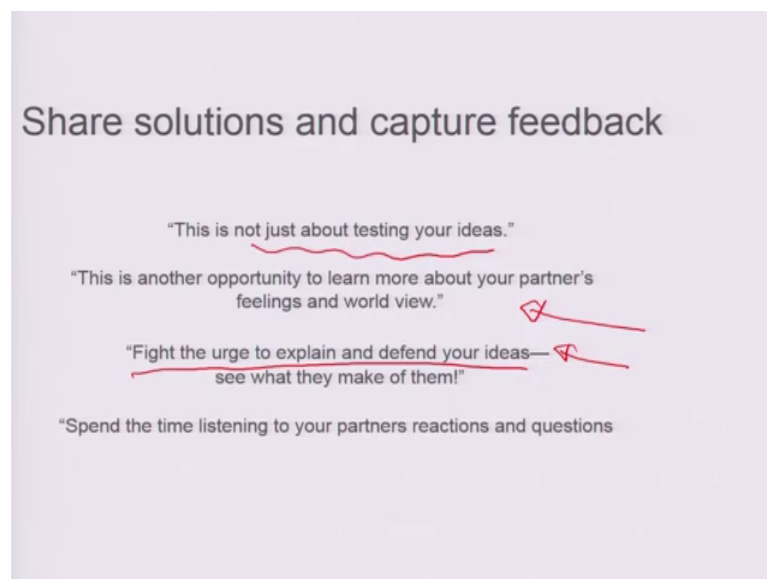
So, you go four volumes first, you try to create as many solutions based on the action statement that you have made and generate the idea do not evaluate just keep generating the ideas and right.

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So, should sketch about three to five radical ways, where you could actually either sketch them or even you know just write them down and then based on whatever alternatives you have generated you will finally, try to.

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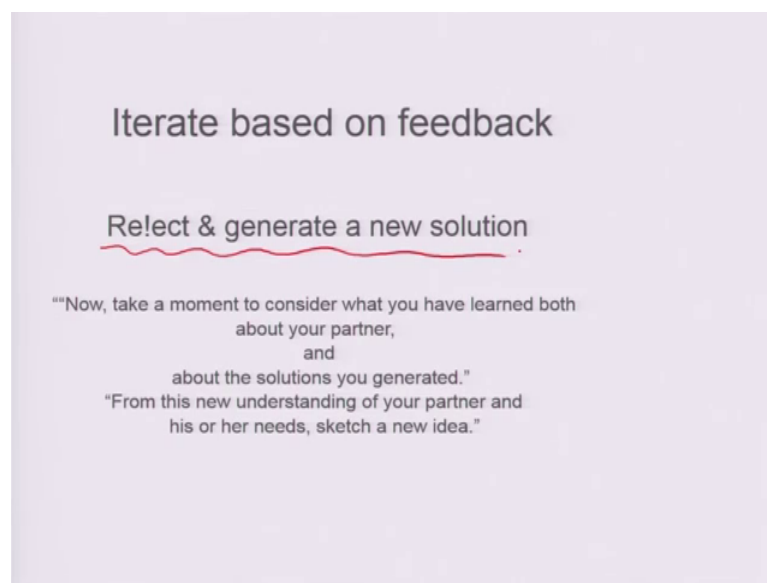
Share the solution and capture the feedback, where you should not impose upon your partner about your ideas and how they test it, but just learn what is the feeling towards whatever idea you have generated that you would like to give as a gift to your partner ok;



fight the urge at every step to explain and defend do not defend the idea that has been generated.

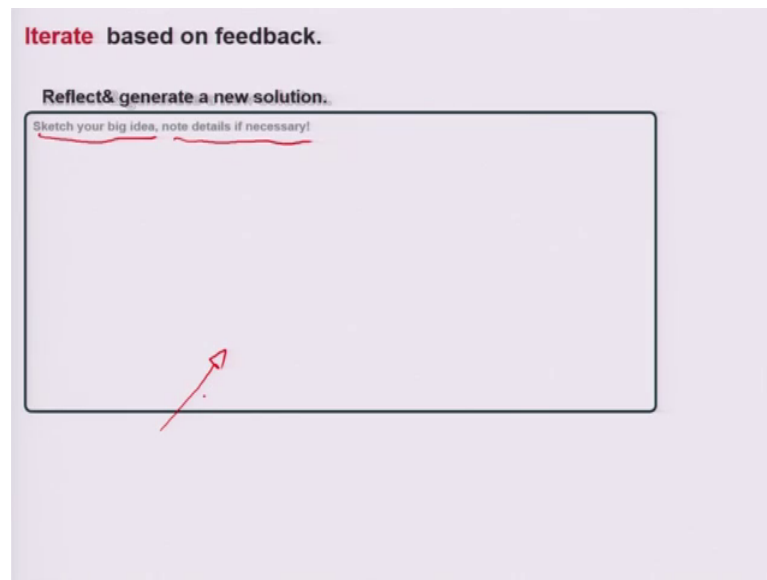
See what passively when you are giving an idea to a person what the concerned person makes of; it may be a very critical reaction it may be a very pleasant reaction, but then that gives you an instance of whether you could actually map the person's mind towards you know the need that he or she may be having. Spend more time in listening and not reacting and questions that you have should only be based on how you would improvise.

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So, based on that these solutions can be captured and you know iterated again and you can again refine and generate sort of a new solution which you record here.

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So, finally, that big idea that you would like to sketch can actually go in here and this can be shared again with your partner to see how he or she reacts on that. So, this idea or this whole activity I would like you to do probably for a few minutes, and then in the next module I would sort of give you some details about what our student groups do to it when we looked at this problem statement or we gave them this problem statement and what kind of ideas got generated. So, I would like to end this particular module here.

Thank you very much and we will see you in the next module.