Understanding Design Thinking and People Centered Design
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Lecture - 15
Concepting and Building
Rapid Prototyping

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Now, we move on to the last section of this part, Concepting and Building, where we have been working on trying to come up with ideas and then make those ideas, make different representations of those ideas. In storyboards we learnt, that how do we present our idea, in terms of how it looks as customer and the product system or customer and a service system together, as in both those components as part of a system. So, you are able to see what the customer goes through, the user goes through, as well as what is happening in the product.

So, that is what storyboarding was about, after we generated the ideas, we learnt how to narrow them down, how to converge them and then we created the storyboards before we even think of creating the product or the service. Nothing exist we are just starting to, we created the scenario and now we are going to create the version of the product and we call that rapid prototyping. Prototyping is to create a model; a representation of the

product and rapid is to do it quickly, very quickly, without spending a lot of time or resources, which is expense.

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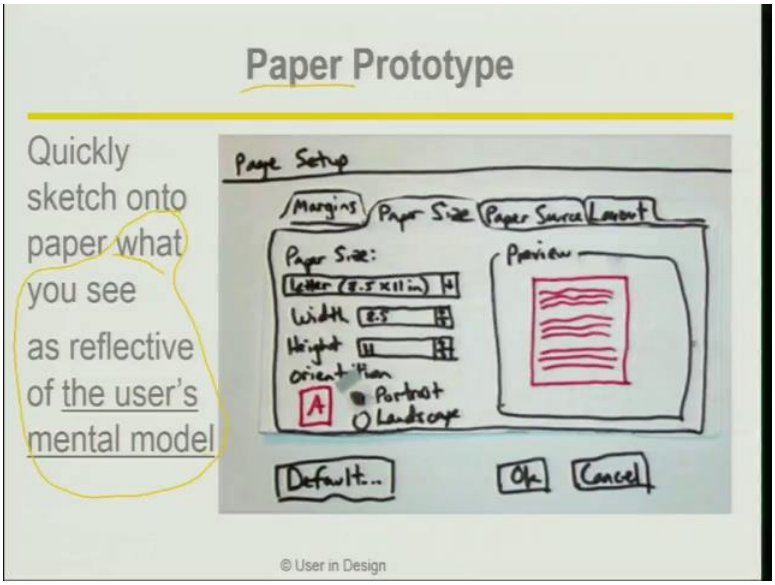

Rapid prototyping, here is an example of what we call a paper prototype. So, you can see how crudely its put together, very, very quickly, but it conveys to you, what this is, it gives a sense of you know, that it has various tab's paper size, paper source, layout, this is probably related to a printer, you know you are choosing the paper size, the width, then the height and the orientation portrait or landscape, etcetera, etcetera. So, it is giving you pretty well, what this is envisioned to be, while this must have taken you know, about two minutes to create.

So, a paper prototype is something, in which you quickly sketch on to paper, what you see as reflective of the user's mental model, what you see as reflective of the user's mental model. So, what this means is that, you have done your research, you know gotten all this feedback from users and all that and at this point you have a pretty strong sense of what the user needs are, what their mental model is, you also try to construct their mental model, based on all this information and the insights and then you ideated and you discussed within the team and you have come up with different possibilities and you know arrived at one concept, that perhaps is the best one from the perspective and based on your understanding of what the user needs are.

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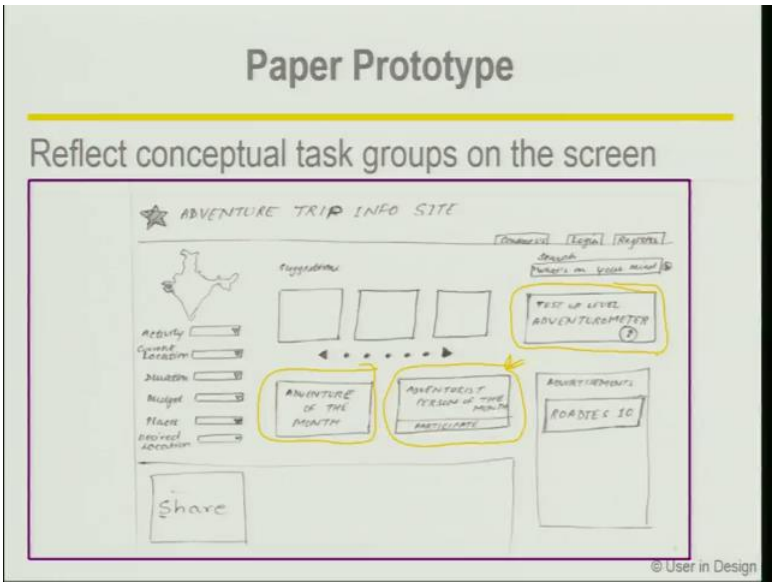

So, that is the user's mental model that you need to reflect now on paper. It needs to be shown, because this is what the user would be expecting to see. So, reflect different task groups on the screen, you know when you had your different themes that emerged and those are probably the important key elements of the design that are very important for your user.

So, here let us look at the adventure travel project that we were talking about. So, this is the first one, of the very, very early prototypes and of course, it went through lot of revisions and things got changed, but this was one of the early ones and you can see that you know the map of India that it is adventure sites within India, you can see that it has the activities, different activities, location, duration, budget, places, desired all of those things that you can choose. Now up here there are some suggestions and it says you know, search, what is on your mind, now look at this, this is something that came out of, not directly from the user, but they felt that people are, remember I told you people are a little fearful, they are anxious about adventure travel.

So, this is trying to reflect that and project in a fun way saying, test your level of your, it is an adventurometer, adventurometer like how much can you stomach, how much of adventure can you stomach. Then there is things like this, this is the adventure of the month, where they are reflecting what is the most popular adventure, then adventurist of the month. So, again remember these are all related to you know, that anxiety that people

feel. So, this thing that, here is the person perhaps someone just like me, who has done it and; that means, that I can also do it. So, a role model for me of some sorts and then the adventure of the month, test your adventurometer. So, this is all related to basically some of the insights that you got out of your research and your analysis. And again you can see that perhaps that it took like may be ten fifteen minutes, to sketch this together. It is the first thing that the user will see; it is reflective of the user's mental model.

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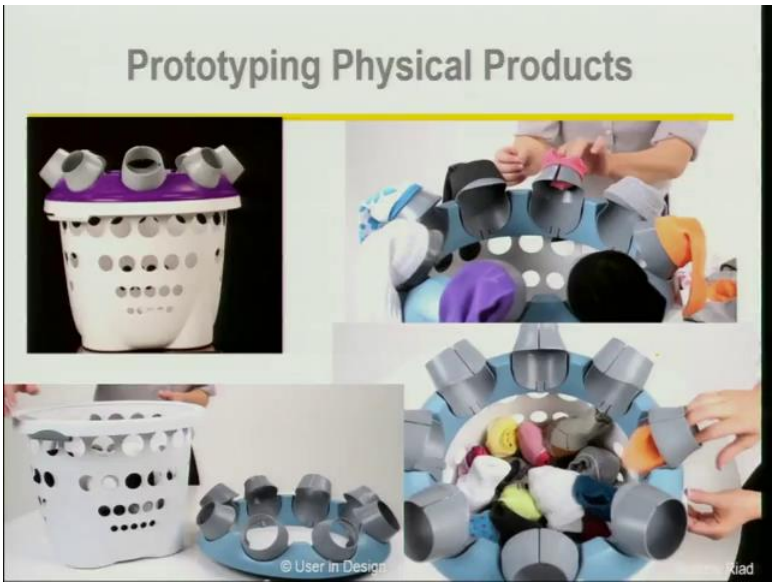

So, this is not just about digital products it is also about physical products. Look at this project, where you know it is a design which was meant to solve the problem, of when we do lot of washing clothes together. And then the big problem is socks, you have like may be 8-9 pairs of socks and they all get mixed in the laundry and everything. So, how can you put them together? So, this designer came up with this neat idea, this little thing that sits on top of a regular laundry basket and then you put one sock on it like this and then you just push the another one and then both of them fall into the basket, as a pair. So, very quickly you can match your socks. So, that is you know the idea behind this. Now what I want to show you is this is the end product that came about, but what about some of the early prototypes.

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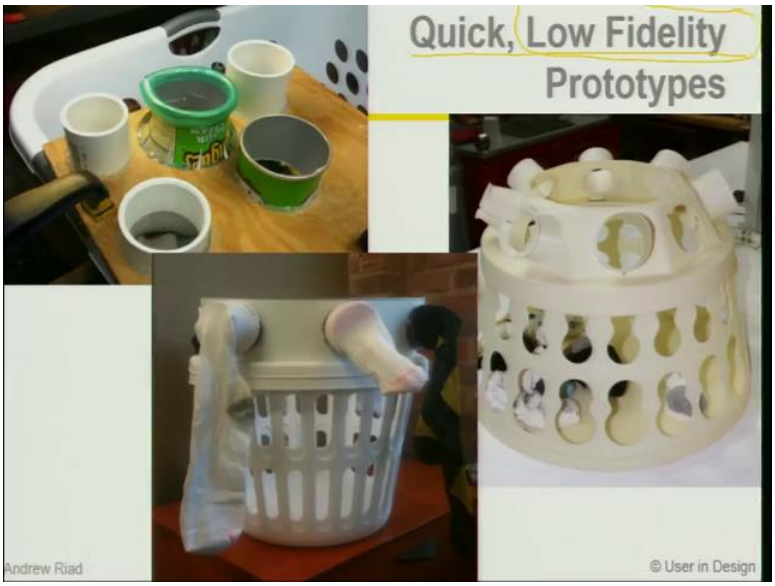

Look at this, it was made out of potato chips boxes and like bottles and perhaps you know, like different like paper canisters and things like that, on a piece of wood. This was the early initial prototype. Then the next prototype, they used the thermocol cups and trying to understand whether it needs to be tapered or does it need to be straight and all of these are being done is a very, very low cost way and being tested with different socks. So, initial prototyping must be of this level, where it is just basic, crude, quick, to give you an idea of the concept itself.

So, this is called a low fidelity prototype, it is fidelity is very low; this is when the product becomes high fidelity. It is very, it is like the real thing, where as this is low fidelity and something that you can put together very quickly, in order to not spend time and not spend too much money on it, that is the whole idea that before we spend lots of time and money, let us even find out before we spend lots of time and money, let us find out whether it even makes sense or not. So, that right at this stage, if it does not make sense at all, we can just discard it right away and we will not have spent much time or money. That is the whole idea, we minimize our risks and make sure, what we are creating is good, is right, it makes sense; you can be more fancy with prototypes.

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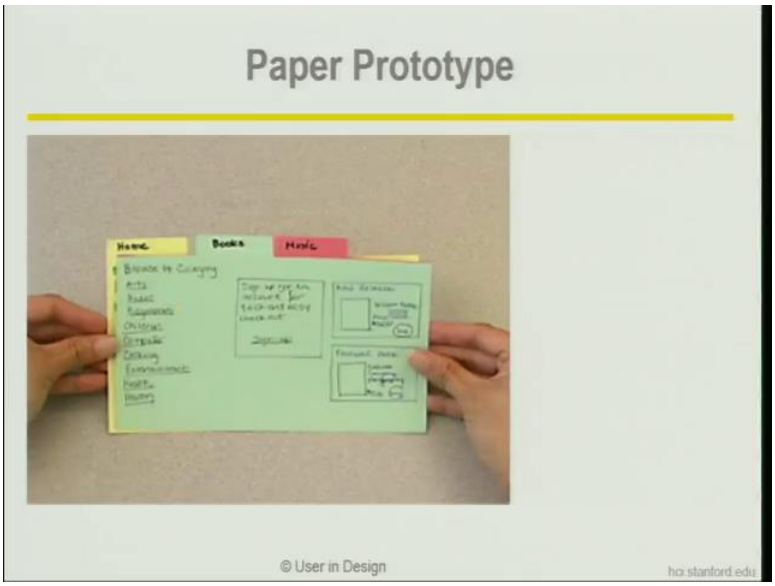

So, this is an example where, you know you have, the interface, this is a for a portal or something like this, some kind of a software interface, where the tabs are taken in different color sheets right. So, you can put all your information and then when you are showing it to the user or explaining it to somebody, you have it in these different tabs, which you can easily move around and give a sense of it. So, this is an example where with a little more time, but still you have not spent much money, much time and you can get it a little fancier, where the user is able to get a little better feel, of how does this whole thing work right.

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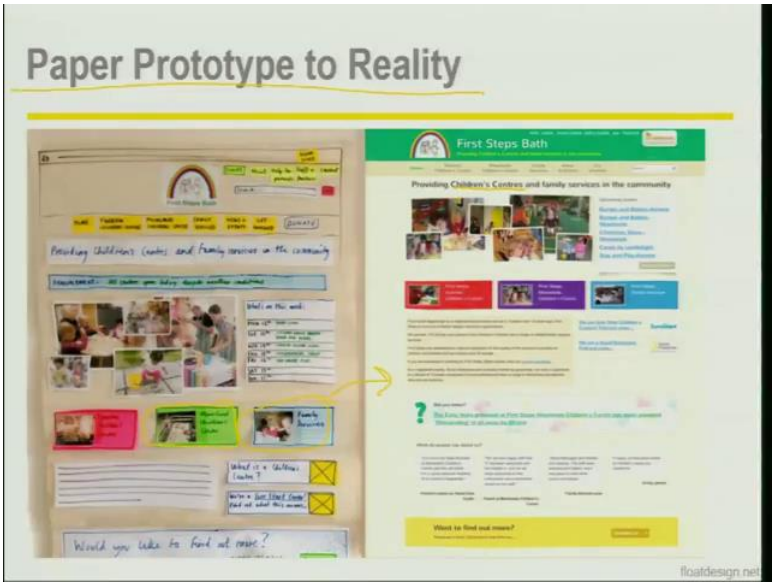

Let us look at an example of paper prototyping until reality. So, this was a prototype that was created for this children center and family services for the community called First Steps Bath. And what I wanted you to see is, this was the prototype, the whole objective behind this is and they wanted the website to be redesigned to depict a more dynamic organization. A more of you know, what is, all the activities and the vibrancy of the place. So, what I want you to look at is, this is the early prototype that was put together and you can see that they have used color paper and they have used some you know, details and all that and you can see how close it is to, this is what the final product looked like.

So, with the paper prototype, just with paper prototype, you can iron out a lot of the issues. I am not saying that this was the first version that got released, it probably went through revisions, but they, it is possible to go through a lot of the revisions just on paper, revise this and as you can see they have put little pieces of paper on this, which are easy to replace, you do not have to replace the whole thing, you remove this, put something else, based on testing of feedback that you might get and then that is how you can advance your prototype and with this iteration and even with a paper, you are able to take a product from this version to this version. And as you can see it is you know quite a lot of things are very similar, in the final product, so from paper prototyping to reality.

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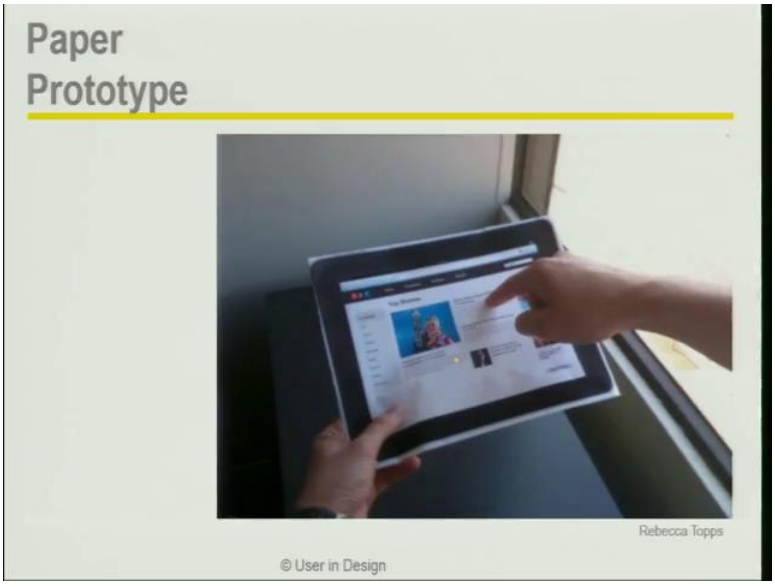

Here is an example of an ipad app, right? You can see how much it looks like the real thing and even though everything is on paper, this they probably put something together quickly on the computer and made a print out of it and also we will talk about usability testing in the next section, but perhaps this is being tested in a vehicle, in a moving vehicle, in a train or something. So, it becomes very easy and portable to take it to different places and get feedback from different places also, by virtue of being a simple humble piece of paper.

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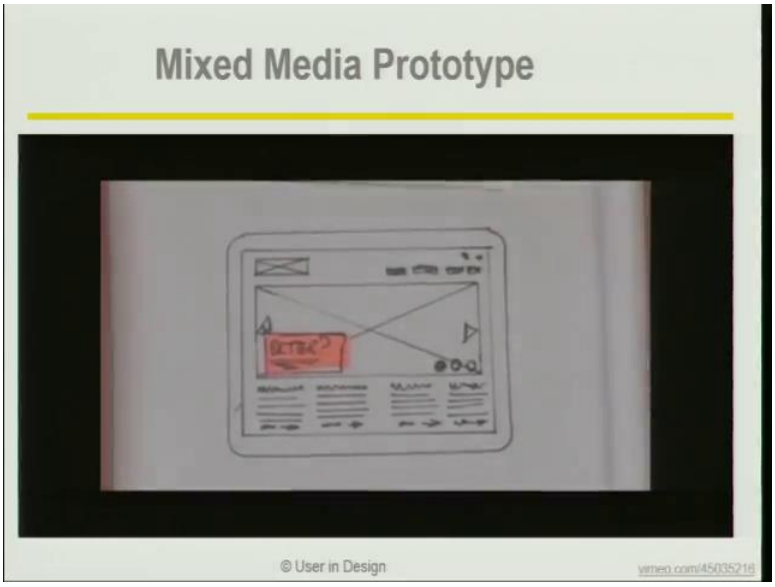

So, now I will show you an example of paper prototype, but trying to maximize on the other kind of tools that exist. So, we have our paper prototype and along with that we overlay some of the capabilities of the computer. So, let us look at this. So, this is an ipad and you can see how they are creating, very quickly creating the prototype out of it. So, the way they envisioned the main interface to look, you know, they are putting all the elements together on that piece of paper.

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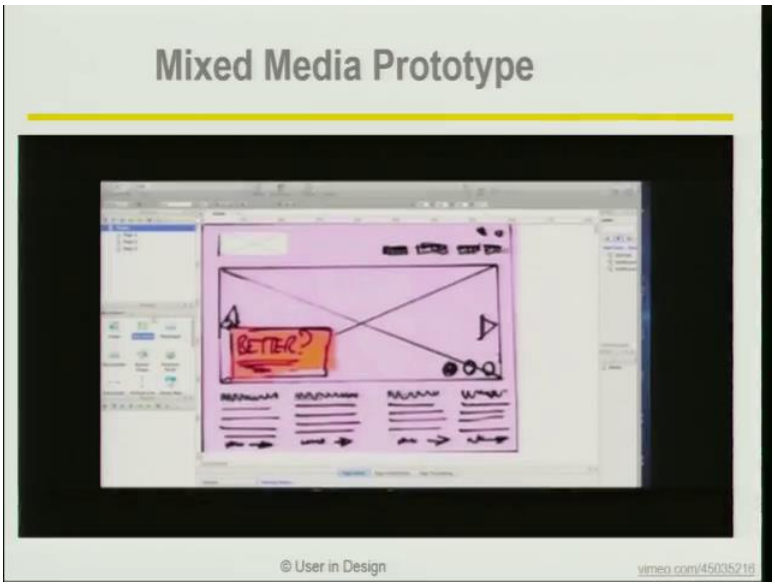

And now they are going to the computer and seeing, how to overlay that. So, they are putting this picture on the computer, putting different text labels on it, as you can see, just making the whole process little more efficient as well as using, you know, making the best use of the right media. So, you saved this on your computer and then you can perhaps replace the text easily and then take a printout. So, this also becomes very powerful way of, you know, making the best use of paper as well as the ability of the computer to quickly edit, quickly make changes. So, you can see how the next version of the prototype is looking now.

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And it is all based on that initial paper version.

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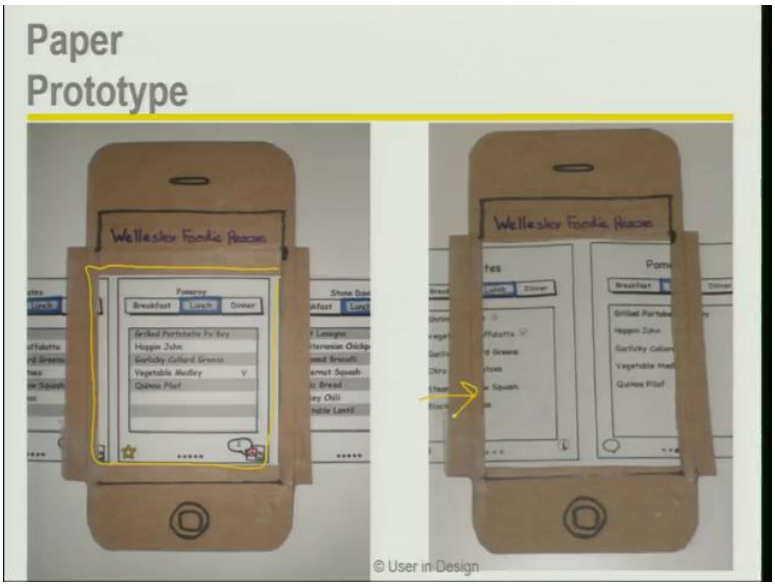

So, that was an example of taking paper prototypes and then adding media you know, adding inputs from a different media, to embellish that prototype and make it more real. Here is another example of a paper prototype and this is for a food service, on a particular campus and you can see how in this using a paper window. This is the window they have cut out and just using the window how they are using paper to scroll through this, scroll through the interface. So, this is how you can see you know, it is going to give the user a sense of something scrolling. So, it is you know, very, very simple little tools, very clever little ways of taking something and bringing it to life.

It is all smoke and mirrors, it is all fake, but believe me when we speak about usability testing and speak about how it connects with the user, when it does, believe me while you might feel that this is does not give the sense of the real thing, when you are testing for the what works and what does not work in your interface, this works very well from a user's perspective.

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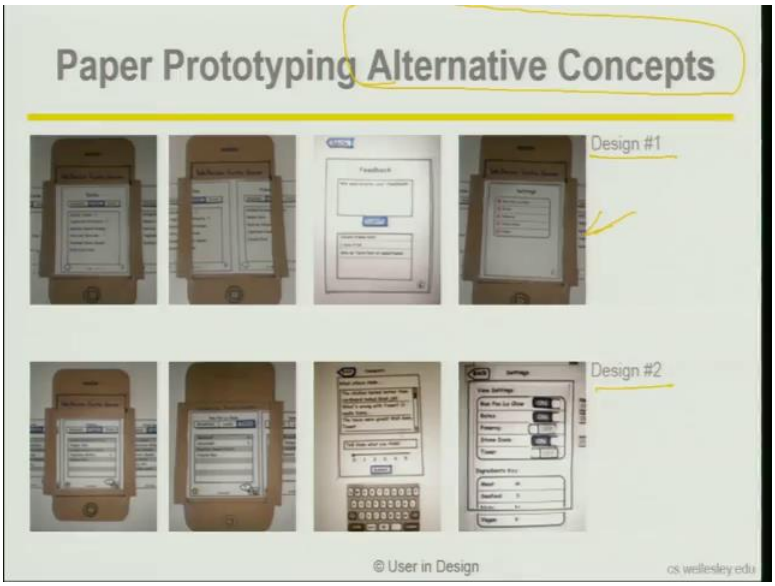

So, in this same design, they actually had created two alternatives, design number one and design number two and they tested both the alternatives. So, again in a situation like this when you have two or three alternate designs, being able to do it on paper, versus trying to make something real, is extremely cost effective, is extremely efficient way to do it. So, you can quickly evaluate two designs and in this case it. So, happened that they got a lot more negative feedback about design one and then they started pursuing design two. So, it is very powerful for prototyping, alternative concepts as well. That you can quickly do at less cost.

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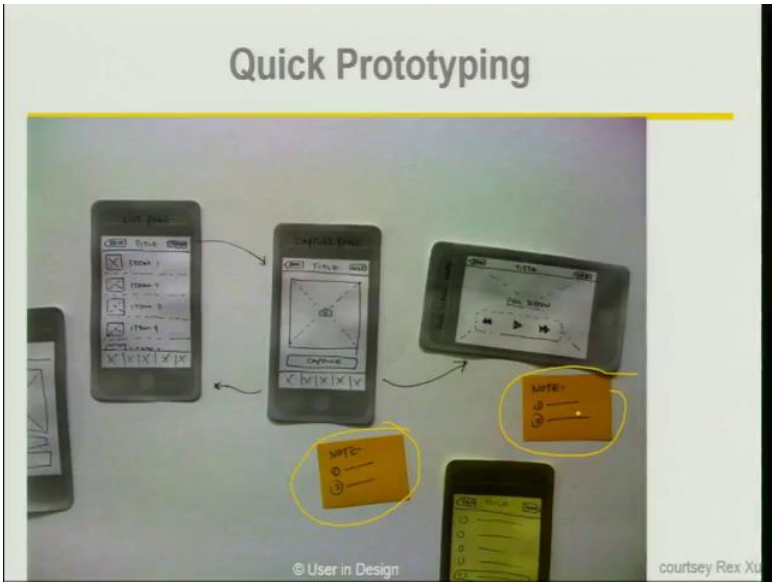

So, this person actually, he was trying to come up with post-it notes of the iphone, that you know, could be used very quickly for prototyping, like a template like this. So, if you look at this, this is probably like a music player, some sort of a music player interface, where you are seeing the music samples and you are clicking the picture of the album, perhaps on your camera and then it comes together to play your music and you can always overlay things, parts of it, with post it notes and things like that. So, you know you can see that how quickly you can build a prototype and how quickly you can determine whether it makes sense or not, so that you can eliminate things that do not make sense. I am, you know, over emphasizing this point that is the whole point of it.

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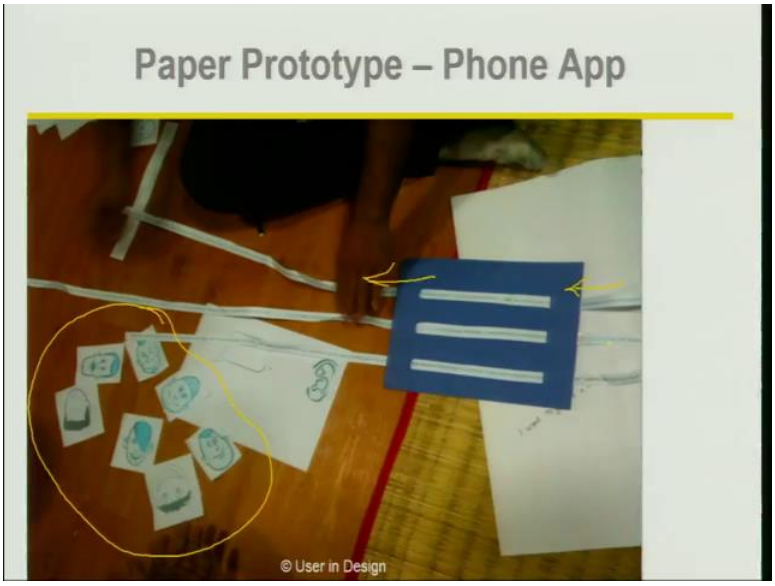

Here is another example of an application, where we were working on what was called a thought sharing application. Where people would share their thoughts and one of the important things is, you know, there would be multiple thoughts of people, running through it. So, this was an example where, you know this, this strip again in paper was meant to scroll this running sentence of text and then also the users initially had to select an avatar of theirs, you know, who are you, what do you represent and these avatars were shown to the user initially. So, in this way, again using simple paper and pen, you can do a lot just by cutting it and you know using different techniques like this one, that we saw that, you can have the scrolling text even, so well visible, just through a paper prototype and the scissors, of course, right?

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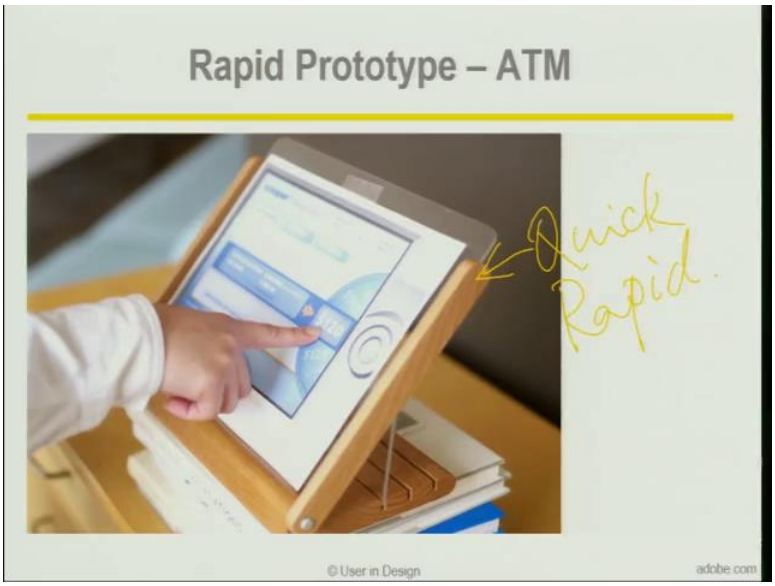

Here is an example of an ATM, that was being tested, a new ATM interface, that was being tested. I want you to now understand how this was put together, very quickly, again it is finally, a piece of paper, but they have also positioned it at the right height, at the right inclination, all rigged up. You can see they have put it on the bunch of books, over here, to get it at the right height, they have put it on an inclination with some kind of a swivel contraption, that is probably belongs to something else, but the point is that, it is all very quick, it is all very rapid, that is what is the power and the point of prototyping, doing it quickly.

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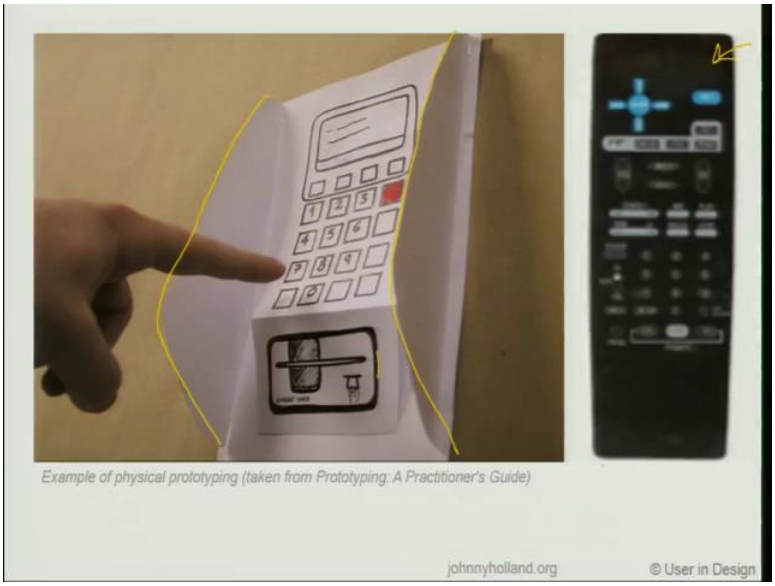

Here is another example of prototyping of an ATM. You can see in this case, it you know, they have just they have created this privacy cover that you have on ATMs and again it is just a single piece of paper, but you still get the feel of the slot and then the signs and then the keypad and the display and everything. Even you know, simpler than the previous one, just done with one piece of paper. This I would like to show you, unfortunately I am not able to show you the, the actual version, but it is part of the work, in working with remote controls.

Now this while it looks quite real, this was just a printout on paper, of one design and this was pasted on a piece of thermocol and the alternative design. There were two alternative designs, was pasted on the other side of the thermocol. So, when users were testing one design, I would have them hold it like this and then tell me what they would press, as we are trying to define you know which, which of these make sense, what labels make sense, what layout make sense and then when we are testing with the other design, just flip it. So, between the two designs on paper, paper printout was a piece of thermocol only, again very, very low cost, almost no cost way of creating a remote control and in the right size and everything, people holding it with their hand, they feel it is like a real remote.

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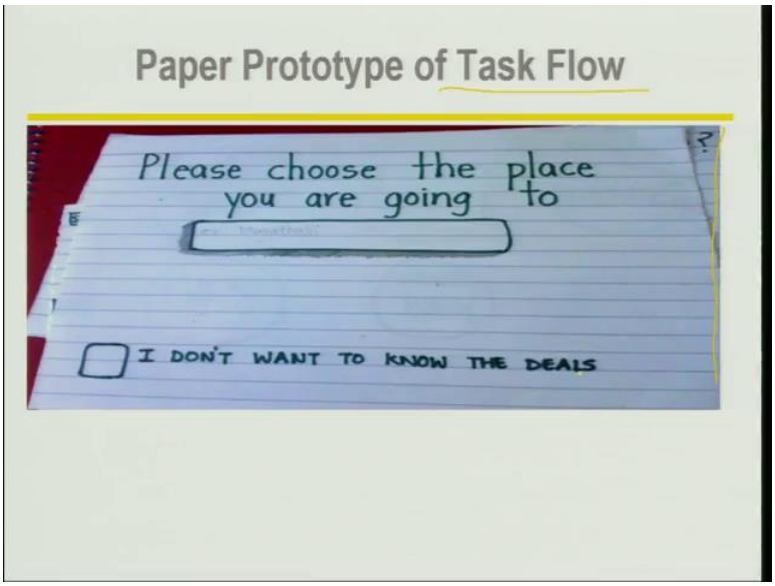

So, now we look at an example of how we show progressive interaction on an interface, on a digital interface, on an interactive product. How we show it through a paper

prototype, which we call the Task Flow, how the flow of the task happens from one screen to the next and I am going to show this to you through the example of the auto rickshaw driver based product that we were coming out with. So, now, this is done on plain and simple index cards, you know, the kind that you use in the library, the library index cards. So, please choose the place you are going to and this is what it says then through interactions.

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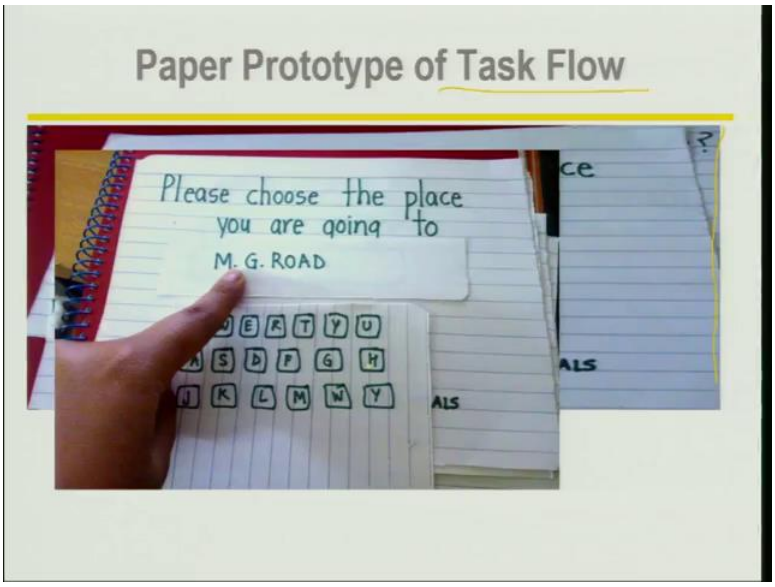

And this could be used in the usability testing, through the interaction through a usability testing, you give them the alternatives, again done on scraps of paper and then they are typing it on this make belief keyboard.

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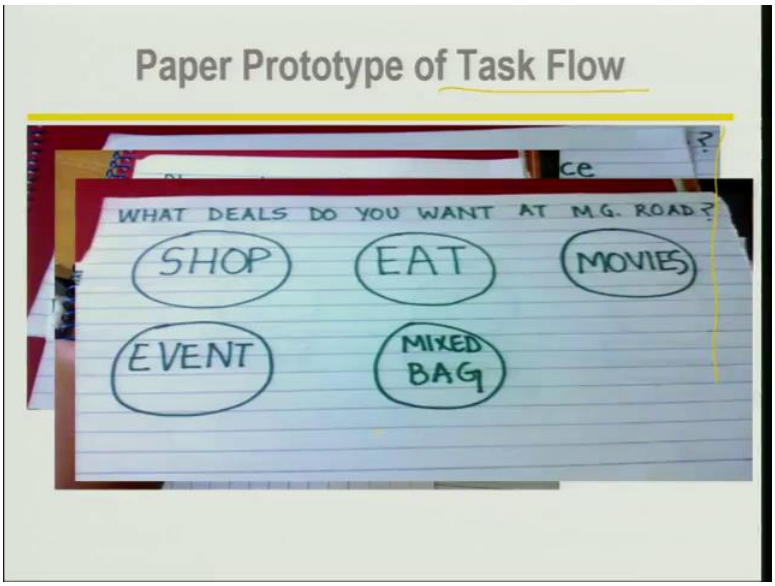

Then presenting the different alternatives based on, they have selected, MG road what, what are the different alternatives and then the user would point to something, as if they are clicking on it.

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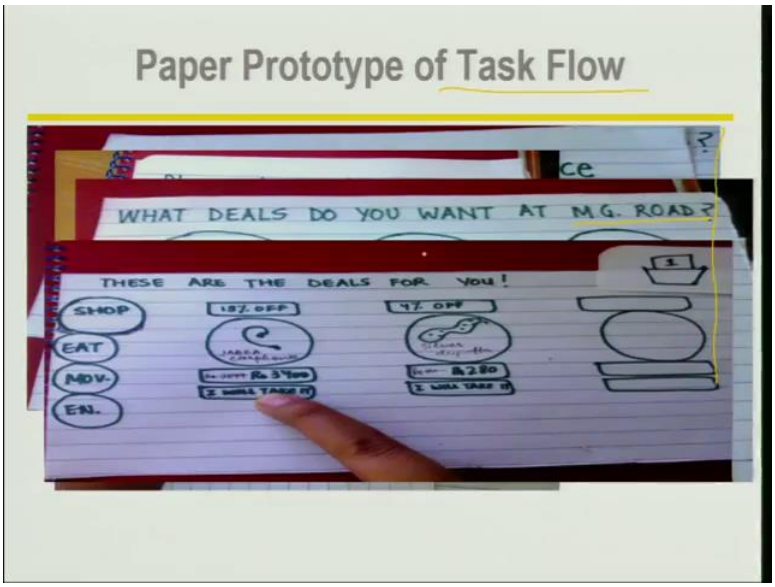

And then the next screen comes up, these are the deals for you right? So and so, has this much percentage of, this much percentage of and so on and so forth. So, it is showing you all the deals and the successive screens based on what you chose over here, the next alternative is being shown to you, the next choice is being shown to you, again on that

same simple piece of paper and then the next one, let us assume they have chosen one of these.

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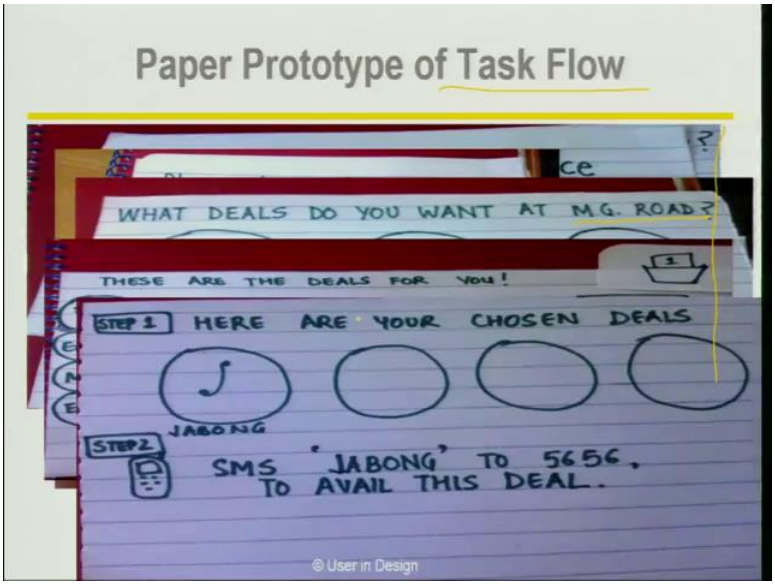

And it says, here I have chosen deals, SMS jabong to, whatever it is. So, this is showing exactly what the user chose. So, through this whole thing, you can see how you can create a successive set of screens on paper, to give the feeling of an interactive product. So, this is paper prototyping taken to the next level.

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Alright, this is an example of session that we did in rural Utter Pradesh and we working with, it was a collaborative effort with the people from a village, trying to design things that belonged in their context, things that they would work with the kind of products and materials and everything that they have available. So, the problem here was that you know typically there are not, there are not toilets in lots of homes in the village. So, the women need to go in the fields and then if they going out in the open, what can we do to make it not such a horrible experience for them, how can we create something that will give them a little bit of comfort.

So, one of the concepts that was prototyped, was an umbrella, an umbrella that would have, you know or rather it would use the frame of an umbrella and that would have panels, that once they sit down they can just drop those panels and it forms a like a little bit of a privacy cover and you can see it is made with a broken frame of an umbrella, it is made with the jute pieces of sacks, that are cut out. So, with very minimal resources, this was put together, designed, along with them with a lot of their ideas and inputs and enough to give a feel for what is this product that we are talking about, whether it even makes sense, how easy is it to you know to open and use and things like that and what else could it could be needed, how could it be refined, so this again another example.

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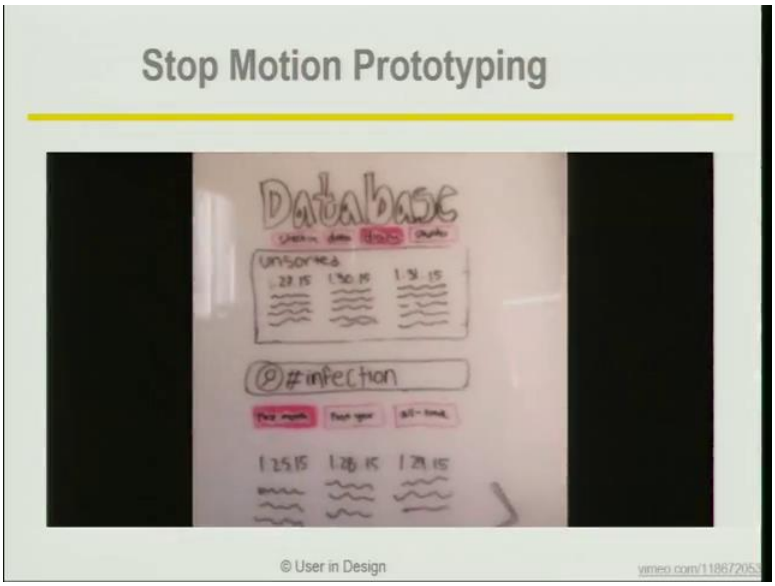

Now, what I am going to show you now, is a video where you can see how prototyping has been used for the different screens, for example, as an interface goes through

different levels of interaction, taking that and photographing them and stringing them together, how you can give a feel for the real interaction. It is all just fake, you record them and strings them together and it gives you the feel of what the real interaction is like and this can be very powerful in, when you might want to demonstrate this to somebody, by the way, this was a medical based product.

So, you can see how effective this was, this was again a paper prototype, right? A quick sketch that was being done, perhaps, on the wall or perhaps on paper and then how very effectively using video, to string them all together it gives you a complete sense of how the product works. So, this is another very effective way using paper and then taking it and pulling it together through video.

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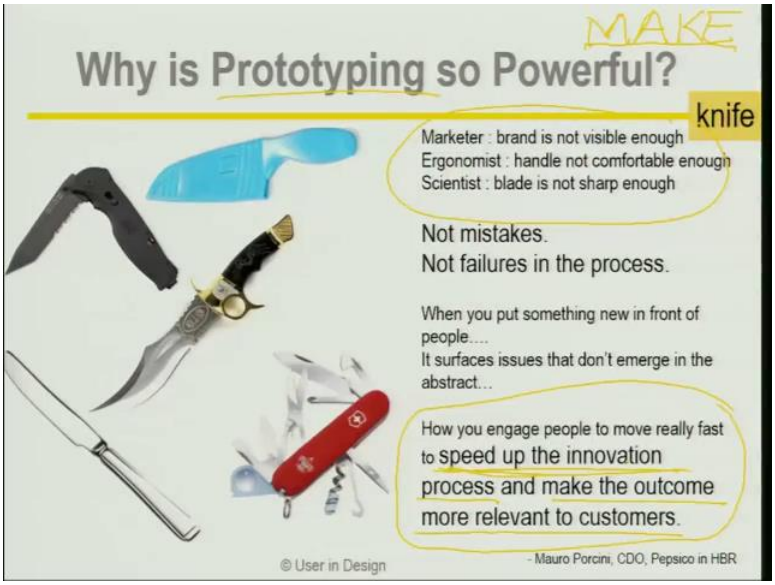

So, now why is prototyping so powerful and I cannot overemphasize enough, about how powerful it is to take those first and initial ideas of yours and you know, quickly make them, make is you know, the most important word and if you remember when we spoke early on, in the beginning about design thinking, someone who is comfortable with jumping in and making their idea, is a very key design thinking skill to have.

So, why is it so powerful? It is so powerful because, it brings us together with a common understanding. So, if I say the word knife. Now if I say the word knife, every one of you has a certain image of a knife in their head. You are thinking something, there is some image that is coming in your head, someone may have this image, someone may have

this image, someone may have this image, someone may have this image and someone may have this image. So, what is it we are looking to looking to design a knife for example, so, if I quickly make a prototype of a knife, a marketer would be able to say looking at it, hey the brand is not visible enough, the ergonomist might be able to look at it quickly and he would say the handle is not comfortable enough, the scientist might say, the blade is not sharp enough, these are not mistakes, make no mistake of it, these are not mistakes. They are not failures in the process, they are a way to be more successful, more successful, less risk and have better confidence in your, what you are designing.

So, when you put something new in front of people, it surfaces issues that do not emerge in the abstract, right? When you just say it or when you kind of describe it, which is how we often do, we have something in our head and then I am describing it to you and then you know the picture in my head, is what I am describing and the picture that is forming in your head, is something completely different, that is what we take out of by creating a prototype. So, how you engage people to move really fast, the minute you create a quick prototype, you are able to get people's responses, feedback and for them to be able to say, which parts of it makes sense, what does not make sense, what they understand and there would be many people saying, I thought it worked so and so way.

So, engage people to move really fast, to speed up the innovation process and there will be several of you who are probably thinking, this takes too much time, believe me, it takes less time, it does not take a lot of time, which is why we do it with paper, with you know, all kinds of things that you find around you, scraps of paper, sacks, cardboard, used cartons, chips boxes, packets, bottle covers, scotch tape and things like that right? So, it helps you speed up the innovation process and make the outcome more relevant to customers. Please understand the importance of this, paper prototypes or rather prototyping is so powerful, because it helps you speed up the innovation process and make the outcome much more relevant to customers.

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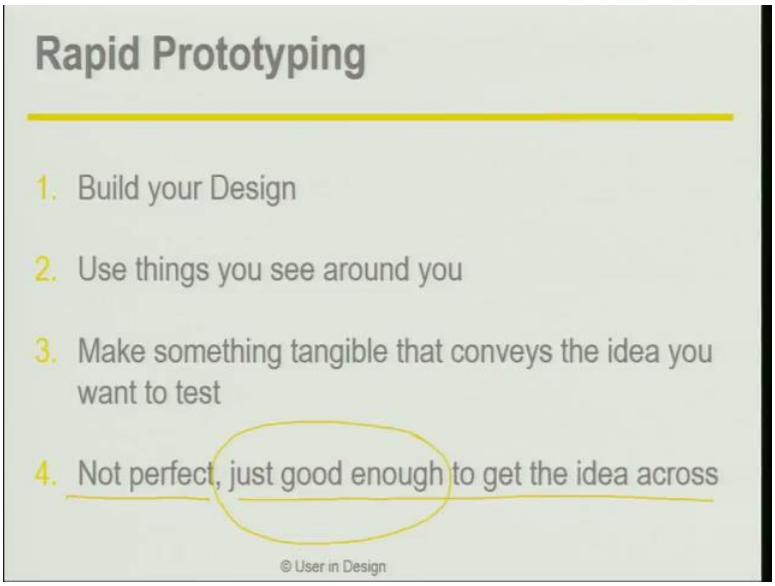

So, you eliminate what does not work and you move on to what does work, therefore, rapid prototyping.

So, what is rapid prototyping? Build your design quickly, using things you see around you and if in the room that you are sitting, you look around, you will find a lot of things that you can use to quickly prototype, you just have to be a little imaginative. Make something tangible that conveys the idea that you want to test, it conveys to someone else what is it that is in your mind. It is not perfect, it may be far from perfect, but it needs to be just good enough to get the idea across, just good enough, that is the important thing to remember about rapid prototyping.

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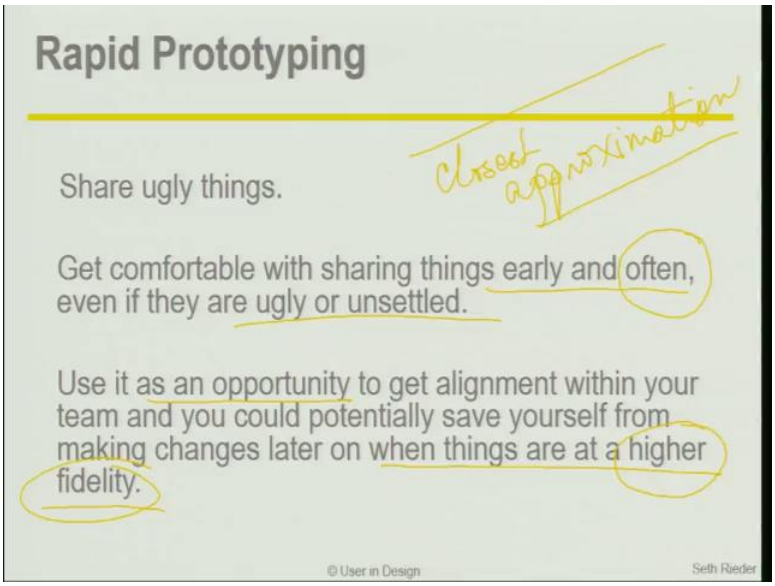

Be comfortable sharing ugly things, it is absolutely fine and it is the smart thing to do. Do not worry about how ugly your prototype looks, how it is strung together with pieces of tape and then one tape shifts here and the whole thing will fall apart, it is OK, it is that is the purpose of an early prototype. Share ugly things, get comfortable with sharing things early and often, this is not a one time vaccination, but it is something that you keep sharing, again and again, even if they are ugly or unsettled.

Get comfortable with that. Remember one of the things that we talked about as a design thinker, that you have to be comfortable with ambiguity, comfortable with things not being perfect, not being all defined. At these stage things will not all be defined, you will create the closest approximation. That is your paper prototype. Use it as an opportunity this is why, you create the closest approximation, to use it as an opportunity to get alignment within your team, as I said everyone starts looking at it and everyone has a common understanding and you could potentially save yourself from making changes later on, when things are at a higher fidelity. We will speak more about this in the next section, but higher fidelity means more costs. It becomes more and more and more expensive, as you go on making things more and more and more refined and more perfect.

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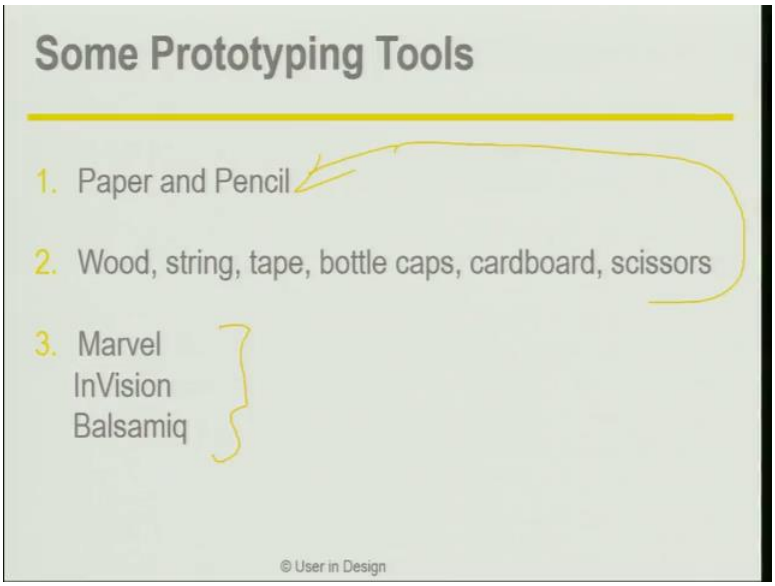

So, some prototyping tools that are commonly used, paper and pencil as I told you, wood, strings, tape, bottle caps, cardboard, scissors, they all go a long way. And then there are some of these prototyping tools that exist, software tools for building interacting products, which all have free versions, if you are so inclined to use some of these.

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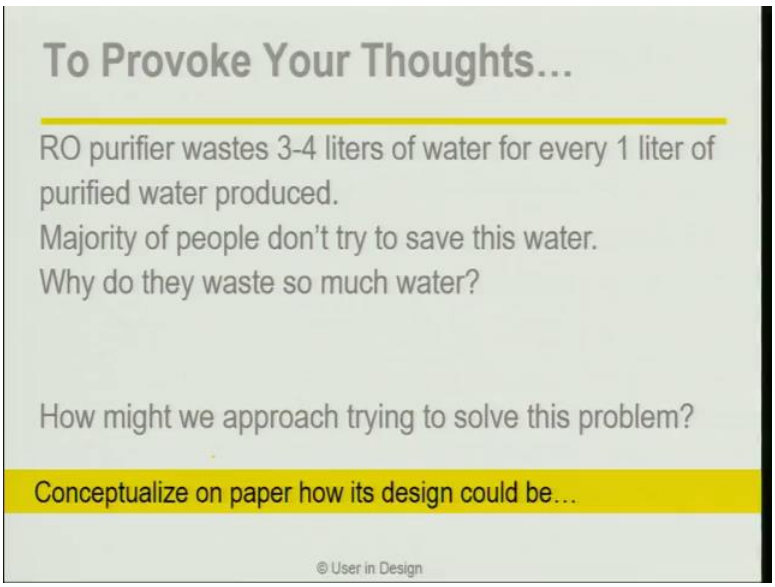

Now, as I told you at the end of every section, I was going to give you something to provoke your thoughts. Again it is just meant to provoke your thoughts and for you to

think about that, using all the different approaches, methods, tools, techniques that we are learning over here how could I approach a problem like this. So, it is meant to provoke your thoughts, it is not an assignment, it has nothing to do with grading, it is just again for you to enjoy the process and try and come up with ideas, right? Try and do due diligence to the process.

So, RO purifier, it wastes 3 to 4 liters of water for every 1 liter of purified water that it produces. Now majority of people do not try to save this water, it is just running down the drain, why? Why do they waste so much water, right? Why are they not doing something about it? So, how might we approach trying to solve this problem? How might we approach trying to solve this problem? Conceptualize on paper, how it is design could be, right? And how of course, as always have fun with it, enjoy the whole process.

Thank you.