

LECTURE 11

INDEX

- Recap • Prototype as design tool • Approaches:
 - Inclusive Design
 - Design for Behavioural change

What is interaction design?

The definition of interaction design is broad and encompasses several traditional disciplines, going from product design to integral design. With “interaction design” we mean the process of **using technology to develop solutions**, that might be visual or physical interfaces.

The point is to use the technology to shape **solutions that are based on the behavior of the system itself**. They are also **related to** the willingness, **the needs** and the goal **of a user** to use it or not a certain system. We need to develop interactive systems that are considered useful and usable and also pleasant from the user point of view.

A very straightforward and clear definition of interaction design has been given by **Jonas Lowgren** that defines: “Interaction design is about **shaping digital things for people’s use**.”

Shaping is about the activity of design, because as designers, we shape things, we give form to the things that are surrounding us. Digital things are related to technology, to the different kinds of technologies that we might use within our project, people's use, people use related to the user behavior, motivation, approach, profile, segmentation.

We have to design for the user, focus on his behavior and attitude and consider the perspective within the design process. As interaction designers we have to **design for the experience**. So we have to ask ourselves **the why, the what and the how of the interaction**.

The **why** of the interaction is **understanding the user**. The **how** is **related to designing the form** of the interaction. Before thinking about designing an interface we first have to understand if that way of interaction is what our user wants to accomplish a certain goal or a certain purpose. Once we have understood the why of interaction, and consequently how that system should communicate with the user, we find **the proper technology that can support the functionality of that system**.

We can use the word **user or consumer** if the person is **contemporary** just by buying **or using the system**. In order to understand the user, we have **two** clusters of **methods**: the **instrumental** and **non-instrumental** one. The instrumental means that you use a physical instrument (like a bracelet for detecting the heartbeat...). Non-instrumental methods are all the classes of direct

and indirect methods. While we are making the question to the user, we have to consider all the things about the Maslow hierarchy: the basic needs, and consequently. We must reason on the big five, on the personality of the user. While understanding the user, considering the profile of the user itself, we also have to **keep in consideration the emotion process**.

As a designer, I need to be aware of **what the system does**, but what the system communicates? Communication means what I should do when I'm in front of the system.

Every week they are updating the interface, and every week I have to ask myself, what should I do? Because now you have two interfaces. One is the old one and you have another one that is the updated one. And my brain is focused on the previous action that I should make.

And now they are communicating the same action with two different icons. So this is something that you should avoid. It might happen.

We need to consider the physical and the digital part, the affordances and the signifiers.

The **affordances are related to the physical world** and are telling us **what the system can do**. Can I push, can I switch, can I rotate and signify that are the meaning of detection.

We add the **signifiers**, the labels word to support an action. If we are good at making a proper trade off between affordance signifiers, we will **make the user clearly understand what action to make**. The **feed forward, that is the come up of affordance and signifiers**, is how the system is communicating to me what I should do. When I designed feed forward means that you will be able to achieve, from the user point of view, a correct action.

The **feedback is what I'm expecting from a system to happen after I make an action**. The feedbacks are important and are: **visual, auditory and haptic**.

Everything is related to the user, to the context.

In order to hold together the affordance and the same bias, we have to keep in consideration the **human processes**. We **receive the information through our five senses**. Then the informations are elaborated by our brain. We keep information in our brain related to the memory, related to the experiences we have, short, long and midterm memory. And then according to the cognitive process that happens in our brain, that is **in 5 seconds**, after that **we know what action to make**, consequently.

We have five senses which are the channels through which we live, the environment. They affect, into the cognitive process, the short, the long and working memory. The attention is relevant to how a system is provoking or keeping my attention.

That **influenced the different types of memory** and the processor related to the information that I received from the system that will tell me what action to make through my muscle.

We **need to design memorable and meaningful interfaces**. The interface should be attention grabbing, so I shouldn't lose interest in using a certain system. For instance, if you consider several apps or systems that are using gamification. One of the results that researchers are experiencing in this topic is that after a while the user gets bored because there is the first period of surprise. So my attention is grabbed by the fact that it's something that is playful, it is engaging, but after a while user are losing the attention. This is happening. I read a research related to the Fitbit because after three months the interest towards these kind of devices is getting down.

What the system can do or not in terms of real functionality. So once we have understood the why and decided the form of the interaction. So I want to give the information to the user by using feedback or visual feedback, or auditory feedback or active feedback. I need to understand what kind of technology that could be sensors, smart materials or advanced interfaces can support my design activity.

So we might have a material that is changing the color according to the temperature and can be an interface that is telling me if I have the fever or not. I might have a material that is changing its color thanks to the temperature. So for instance, a wallpaper is telling me if the house is hot or cold or I can use the different kind of sensor within the house to communicate the state of the house to the user.

In this view means that everything that can be visible, that is representing an idea and can be shown to someone else. We make a prototype to express an idea, to test the idea.

Is a manifestation of an idea. So something tangible, thanks to which we can communicate our idea to somebody else and that can be tested with the user.

Different example of prototype. The first one is not functional, but on the first one you are using it for testing the dimension compared to the hand, where to place the interface, where to place the hole for inserting the car. In the second one, you are not testing, but showing how aesthetically your idea of bike is.

And in the case of the right you have the possibility to test the ergonomic and the dimensions. So it is physical like the bicycle, but you can use it.

The first one on the left is a prototyping scale of a building and is something that is used to show an idea, how it appears. The second one it's the Arduino prototype that is used just from a functional point of view, for testing an experience.

Prototype is a mindset. I should use the prototype even for the idea generation, for everything, **not just to test**, not just to show, but also as a tool for you to understand.

Within the design phase, you should use different kinds of prototypes, according to the objective that I want to achieve. I could start from the very beginning of an idea to make a prototype in paper, in wood, in plastic, plastic mold...

Prototype is **also a tool that could be digital or physical**. That's why, especially in the first part of the design process, we can say that we can use a prototype to discover problems.

If you prototype first, this will help me not to make errors.

It is **helping to explore design spaces to verify the interaction**.

According to the **different objectives** that we have to achieve, we have **different aims** for the prototype. What is the aim of making a prototype with Arduino? To verify the implementation.

If I have to design new products, new interfaces or new scenarios, I can have a prototype with different aims. Generally speaking, in the field of interaction design, we can say that the role of the prototype might be defined by the general function of representing ideas.

We will go from intangible to tangible. We need to think about the prototype as evolving in terms of aim and of the way it is.

Speculative prototype is related to speculation, and we created authorized context based on our project.

We can have a prototype that is intangible, that can be used to speculate, but also to verify ideas, to reason an idea.

There are different ways which we can cluster the aim of the prototype into, let's say a line that goes from vogue to clearness.

So we can transition from abstract to concrete vagueness to clear. Also using design fiction that is pretty close to speculative design. Think about the fact that the prototype is not just something physical. You materialize and you visualize your idea.

We **can use the prototype to envision**. That means using a prototype to think about the future. We can use the **prototype to provoke**. That means to provoke the audience, the user in relation to a certain topic, that is to speculate. You use the prototype to comprehend, to collect the data, to assess, to validate an idea or to improve an idea, to communicate within a team, to communicate your ideas to someone else. So **the objective is to clarify something**.

We have **two main blocks of prototype**: we can have **speculative and intangible**, that we are still in the realm of vagueness or **materialistic and realistic**. The speculative and intangible are within the cluster of envision, provoke and comprehend.

According to what you are asked to design, you need to ask yourself, can I use the prototype? Which kind of prototype may I use to reach what?

For instance, I want to use the prototype to envision.

This prototype is used to anticipate. What kind of prototype is this one?

Imagine/tangible, but it is a film.

So it **still can be considered a prototype**. It's a piece of movie and you use a piece of movie to anticipate the future. In this case, it's not the prototype to show an idea that you have. You use a prototype to anticipate the future.

This is a tool that has been developed by PhD students

In this case. Instead, this was a sum up of different pieces of movie using a certain technology. So she created a library of inspiration cards where she sums up different movies by grouping according to different kinds of technology.

Even in this case, you have a card with a QR code that you can scan in which you can open different kinds of movies that are able to foster and to **anticipate the future**, or to let you reason about a future that you didn't think was possible.

It's a sex toy. You can use a prototype or astrophysical product to discuss a topic that is considered a taboo in our society.

On the right there is an object for personal protection.

This is to speculate about also the topic of letting everybody have means of protection. That can be a gun or a knife. And we are talking about speculating about social concerns.

So you use the prototype to **speculate, envision, provoke and comprehend the user or the market** that you are designing for. And then using the prototype to comprehend is to solve a problem.

In this view, for systems a sketching is a prototype used to comprehend a navigation map. So that can be used for you to comprehend or for comprehending a topic and showing to someone else.

The user journey can be a prototype to comprehend the user, because we use the journey to understand the reaction of the user in relation to certain touch points. Also the empathy map and the business model canvas are prototypes to comprehend.

Campus is a prototype or a business roadmap to comprehend the strategy. So according to the objective that you want to reach, you have different kinds of prototypes. And the field of prototypes is very huge.

These sketches were not enough because you never know with the user that is in front of you. So these were rough prototypes to let the user understand a new way of closing the mask by putting in different pieces, in different parts of the face, for instance, to verify the proportion, because the sketch could have been not enough to communicate the idea.

The prototype was actually the same dimensions, same materials, same interaction of the final product. And we use it to test and to verify if the interaction was coherent, if the user properly understood how to use it, the feedback received, if they were coherent with the context, so far and so forth, or you make a prototype to develop, so you move forward.

And so you have even more and more refined prototype wallets. You don't test it with ten users, but you have a richer sample of clients, not users, because if you want to develop, you use the prototype with the potential client. So it's tightly connected to marketing.

According to the objective that you want to obtain, if you want to communicate, to test, to provoke, to anticipate, you have different kinds of prototype. We can have the prototype being clustered according to the fidelity, so we can have **low, medium and high fidelity prototypes**.

So, for instance, these are **low fidelity** prototypes, in which you try to embrace the idea within. In this case you have a physical, that's a Nintendo gameboy. You can use different papers to simulate different kinds of navigation.

And of course it is to **come in the first step** of the design process, in which you are starting reasoning on the ideas of possible solutions and to discover the problems, to understand the issue.

The fidelity depends on the point of view of the designer. In the right case, you don't have just the arduino, but you also have the aesthetic part that is connected to the functional.

So low, medium and high is related to the field, to the step in which you have. Is also a matter of point of view, the lens through which the designer looks at the problems.

High fidelity prototype instead is a prototype that is very close to the final product in terms of material finishing for heist. This is the high fidelity prototype of the different low fidelity prototype that you saw before. In the case of the phone, it is a functional color, dimension, it is glossy, black, glossy in plastic. It is connected to the application.

This is a **matrix** that could be **useful for understanding what you want to have**, which is the kind of prototype that you have to develop, low, medium or high.

Low fidelity prototype, of course, the **pro is fast and cheap**, the consare that **you cannot test**, comprehend and verify the statistics of it. If you want to test with the user a low fidelity prototype, you have to support the storytelling. Otherwise the first thing that the user will tell you if you show him a low fidelity prototype is "I don't like it".

The **middle fidelity** prototype is **more interactive** and is having a **good balance between the time and the results** that you can achieve. Of course, it's still **not fully functional**. You use the middle fidelity prototype once you are going towards the final project, and then you start **testing the interaction, the dimension, the proportion, the statics**.

The **high fidelity** prototype is **really close to the final**, is **the representation of your ideas, 360 degree, aesthetically, materially, interactively, and is used to test with the user** before going to the mass production of the project. But it is **time wasting**, because you need time to develop a high fidelity prototype.

If you have a low, middle or high fidelity prototype, you can have different kinds of five dimensions of fidelity within each of them.

This is the process of prototyping. You have to decide your goal. So understand, communicate, test or advocate.

These are generally guidelines for thinking about the role and the aim of the prototype. That is to think about the prototype as a tool for exploration, for validation, for communication, and not only for representing a final idea. If you want to know if your idea is valuable or not, you make a prototype to communicate to your user or to your client what is in your mind. You use a prototype to discover problems, to find out issues, to verify if your idea is valuable or not.