

Implementation vs. mental models.

Reference: About Face, Chapter 2.

Remember I said in the first week that HCI is about designing something for other people. This means the designer is interacting with the end user through the artifact he or she is designing. How do we communicate through design? If I communicate with someone from a different country, I first should find out which language she speaks and what cultural background she has. Same here. We need to know what language the user speaks and what background she has, figuratively speaking. Users are not very technical so if we use a lot of technical jargons in the interfaces, they are not likely to understand.

So how does an average person think about technology, and how does he think about interacting with the technology to do his job? what is his current mind set? Let me borrow a great story from the Cooper book to start today's lecture.

While you are watching a movie in a cinema, have you ever wondered about how the movie projector works? Maybe you do because you are engineering students. But for most people, they imagine that the projector merely throws a picture that moves onto the big screen.

The movie projector, which was invented by an Englishman, then popularized by the French Lumiere brothers in the 19th century, works like this. First there is the light source. It shines extremely bright illumination onto each frame of the film for a fraction of a second. This casts the image on the film through a lens onto the screen. It then blocks out the light for a split second while moving another frame into place. Then it unblocks the light again for another moment. This is how the device creates an illusion of moving objects on the screen with an intricate sequence of moving parts.

This story illustrates that how people think about how something works can be very different from how things actually work.

According to psychologists, the human mind constructs "small-scale models" of reality. This model is called the mental model. This model is the representation of a person's thought process for how something works.

The representation of how something actually works is called the implementation model.

For software applications, the implementation model is the inner logic of the system supporting that software. Due to its complexity, the discrepancy between the implementation model and the user's mental model is huge. Fortunately there is the software interface, which is the way the designer chooses to represent the inner-logic of the software and make what the software appears to be. The software interface and interaction behavior determine the designer's model. This is the third model. If a designer is clever, she or he can manage to hide the unappealing details of how the software actually works. He only has to cover enough details to allow end users to smoothly interact with the software.

I have defined for you three types of models: the implementation model (how the software actually works), the user's mental model (a cognitive short-hand of how software works), and the designer's model (the way the designer chooses to represent a program's functioning to the user). What are the relationships of these three models? and how they influence the way we think about design?

As a designer, you can choose how to represent the implementation model: close to implementation model or to user's mental model.

Generally speaking, when a designer's model approximates the (user's) mental model, your design is likely to succeed, meaning users will have less trouble interacting with your system to accomplish their task. Similarly, when a represented model follows too closely the implementation model, the chances are it will be difficult for users to learn to use the software application. Here we assume that user's mental model of his tasks differs significantly from the implementation model.

But the problem is most software's represented models are closer to the implementation model than the user's mental model. One of the reasons is that the designer never cared about knowing the user's mental model. But it's also the case that knowing user mental model is hard. Next week when I teach you observation/interviewing, I will show you how to figure out the user's mental model.

But wait a minute. You will say: "are you telling us to follow an imperfect model?" The answer is "yes". If you want to design something for users, you have to understand the way they think and their limitations. But don't forget. The biggest thrill of a designer is to design an interface to change the way users work and think, and to educate them. One very good example is the recommender technology. When a user types a query, he gets what he asks for. But often he gets more than what he asks for. Items that help solve his needs are much more important to him than items that he asked.

In this course, I emphasize how a designer meets the users half way, and then lead her to the right way of thinking about technology. I strongly believe that design can shape a user's experience.

Warning: there are plenty of examples of using HCI design to harm people and make them buy items they don't need. We have to pay attention to ethics in our work as a designer.

