Tech-Life 4.1 — Comment les technologies changent et changeront votre vie

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Four Computing Eras

1.1 Changing Computers

One computer per many users.

1960s: Mainframe Era
One computer per many users.

1980s: Personal Computer Era
One computer per user.

2000s: Mobility Era
Several computers per user.

2020 and beyond: Ubiquity Era
Thousands of computers per user.

Photography, for example, has retained its familiarity despite moving from being chemically-based to being digital. At the point of creation, people still 'point and shoot' in much the same way as they used to. However, what one can do with images when they are digital is quite different. Whereas, before, we may have only printed one or two rolls of film, displaying the photos on the mantelpiece over, and are often broadcast around the world on websites. Or in an album, digital images are now reproduced many times over, and are often broadcast around the world on websites. Enjoyment, sales, reproduction &iegens, editions.
Even the smartest among us can feel inept as we try to figure out the shower control in a hotel or attempt to navigate an unfamiliar television set or stove. When The Design of Everyday Things was published in 1988, cognitive scientist Don Norman provocatively proposed that the fault lies not in ourselves but in design that ignores the needs and psychology of people. Alas, bad design is everywhere, but fortunately, it isn't difficult to design things that are understandable, usable, and enjoyable. Thoughtfully revised to keep the timeless principles of psychology up to date with ever-changing new technologies, The Design of Everyday Things is a powerful appeal for good design, and a reminder of how—and why—some products satisfy while others only disappoint.

"Part operating manual for designers and part manifesto on the power of designing for people, The Design of Everyday Things is even more relevant today than it was when first published."

—TIM BROWN, CEO, IDEO, and author of Change by Design

DON NORMAN is a co-founder of the Nielsen Norman Group, and holds graduate degrees in both engineering and psychology. His many books include Emotional Design, The Design of Future Things, and Living with Complexity. He lives in Silicon Valley, California.
During my family’s stay in England, we rented a furnished house while the owners were away. One day, our landlady returned to the house to get some personal papers. She walked over to the old, metal filing cabinet and attempted to open the top drawer. It wouldn’t open. She pushed it forward and backward, right and left, up and down, without success. I offered to help. I wiggled the drawer. Then I twisted the front panel, pushed down hard, and banged the front with the palm of one hand. The cabinet drawer slid open. “Oh,” she said, “I’m sorry. I am so bad at mechanical things.” No, she had it backward. It is the mechanical thing that should be apologizing, perhaps saying, “I’m sorry. I am so bad with people.”

My landlady had two problems. First, although she had a clear goal (retrieve some personal papers) and even a plan for achieving that goal (open the top drawer of the filing cabinet, where those papers are kept), once that plan failed, she had no idea of what to do. But she also had a second problem: she thought the problem lay in her own lack of ability: she blamed herself, falsely.

How was I able to help? First, I refused to accept the false accusation that it was the fault of the landlady: to me, it was clearly a fault in the mechanics of the old filing cabinet that prevented the drawer from opening. Second, I had a conceptual model of how the cabinet worked, with an internal mechanism that held the door shut in normal usage, and the belief that the drawer mechanism was probably out of alignment. This conceptual model gave me a plan: wiggle the drawer. That failed. That caused me to modify my plan: wiggling may have been appropriate but not forceful enough, so I resorted to brute force to try to twist the cabinet back into its proper alignment. This felt good to me—the cabinet drawer moved slightly—but it still didn’t open. So I resorted to the most powerful tool employed by experts the world around—I banged on the cabinet. And yes, it opened. In my mind, I decided (without any evidence) that my hit had jarred the mechanism sufficiently to allow the drawer to open.

This example highlights the themes of this chapter. First, how do people do things? It is easy to learn a few basic steps to perform operations with our technologies (and yes, even filing cabinets are technology). But what happens when things go wrong? How do we detect that they aren’t working, and then how do we know what to do? To help understand this, I first delve into human psychology and a simple conceptual model of how people select and then evaluate their actions. This leads the discussion to the role of understanding (via a conceptual model) and of emotions: pleasure when things work smoothly and frustration when our plans are thwarted. Finally, I conclude with a summary of how the lessons of this chapter translate into principles of design.
The gulfs of execution and evaluation

The Psychology of Everyday Actions

The Gulf of Evaluation

was easily bridged, at first. That is, the catch was released, the drawer handle pulled, yet nothing happened. The lack of action signified a failure to reach the goal. But when other operations were tried, such as my twisting and pulling, the filing cabinet provided no more information about whether I was getting closer to the goal.

The Gulf of Evaluation reflects the amount of effort that the person must make to interpret the physical state of the device and to determine how well the expectations and intentions have been met. The gulf is small when the device provides information about its state in a form that is easy to get, is easy to interpret, and matches the way the person thinks about the system. What are the major design elements that help bridge the Gulf of Evaluation? Feedback and a good conceptual model.

The gulfs are present for many devices. Interestingly, many people do experience difficulties, but explain them away by blaming themselves. In the case of things they believe they should be capable of using—water faucets, refrigerator temperature controls, stove tops—they simply think, “I’m being stupid.” Alternatively, for complicated-looking devices—sewing machines, washing machines, digital watches, or almost any digital controls—they simply give up, deciding that they are incapable of understanding them. Both explanations are wrong. These are the things of everyday household use. None of them has a complex underlying structure. The difficulties reside in their design, not in the people attempting to use them.
The Psychology of Everyday Actions

pedestrians in front of me, and whether there are traffic signs or signals that I have to obey. I must move my feet back and forth between pedals and my hands to the turn signals and back to the steering wheel (while I try to remember just how my instructor told me I should position my hands while making a turn), and my visual attention is divided among all the activity around me, sometimes looking directly, sometimes rotating my head, and sometimes using the rear- and side-view mirrors. To the skilled driver, it is all easy and straightforward. To the beginning driver, the task seems impossible.

The specific actions bridge the gap between what we would like to have done (our goals) and all possible physical actions to achieve those goals. After we specify what actions to make, we must actually do them—the stages of execution. There are three stages of execution that follow from the goal: plan, specify, and perform (the left side of Figure 2.2). Evaluating what happened has three stages: first, perceiving what happened in the world; second, trying to make sense of it (interpreting it); and, finally, comparing what happened with what was wanted (the right side of Figure 2.2).

There we have it. Seven stages of action: one for goals, three for execution, and three for evaluation (Figure 2.2).

1. Goal (form the goal)
2. Plan (the action)
3. Specify (an action sequence)
4. Perform (the action sequence)
5. Perceive (the state of the world)
6. Interpret (the perception)
7. Compare (the outcome with the goal)

The seven stages of the action cycle

The design of everyday things
Don Norman

The seven stages of the action cycle
Modèle conceptuel

Ce que nous croyons savoir sur un objet, une procédure, un système

Construit sur la base de connaissances et d'expériences

Non nécessairement complet ou correct, mais "suffisamment bon" pour être utile
The Psychopathology of Everyday Things

The design of everyday things

Don Norman

FIGURE 1.9. Refrigerator Controls. Two compartments—fresh food and freezer—and two controls (in the fresh food unit). Your task: Suppose the freezer is too cold, the fresh food section just right. How would you adjust the controls so as to make the freezer warmer and keep the fresh food the same? (Photograph by the author.)

FIGURE 1.10. Two Conceptual Models for a Refrigerator. The conceptual model A is provided by the system image of the refrigerator as gleaned from the controls. Each control determines the temperature of the named part of the refrigerator. This means that each compartment has its own temperature sensor and cooling unit. This is wrong. The correct conceptual model is shown in B. There is no way of knowing where the temperature sensor is located so it is shown outside the refrigerator. The freezer control determines the freezer temperature (so is this where the sensor is located?). The refrigerator control determines how much of the cold air goes to the freezer and how much to the refrigerator.
Rendre les choses visibles

Rendre les choix visibles
Rendre les effets des actions visibles
Permettre de déterminer facilement l'état du système
Amazon’s Alexa started ordering people dollhouses after hearing its name on TV

Google’s Super Bowl ad accidentally set off a lot of Google Homes

Amazon's Echo is bringing the eighties back, and not always in a good way
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce que sait faire un système autonome ?

Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
**Comment savoir ce qu’il fait ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?

Comment comprendre pourquoi et comment il le fait ?
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?

**Comment influer sur ce qu’il fait ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?
Comment influer sur ce qu’il fait ?

**Comment lui (re)prendre le contrôle ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?
Comment influer sur ce qu’il fait ?
Comment lui (re)prendre le contrôle ?

Veut-on réellement de ce système ?
L'outil transparent n'est pas celui que vous ne pouvez pas voir
L'outil transparent n'est pas celui que vous ne pouvez pas voir

C'est celui qui ne vous gêne pas mais vous laisse vous concentrer sur votre tâche
La technologie n'est pas une chose qui "arrive"
La technologie n'est pas une chose qui "arrive"

La technologie se décide, elle se conçoit
Pourquoi fait-on ces choses ?
Pour quoi fait-on ces choses ?
"Because we can"?
"Because we can't"?
So, they've started psi research because they thought we were doing psi research, when in fact we weren't doing psi research?

Yes, sir. But now that they're doing psi research, we're gonna have to do psi research, sir.
Comment fait-on ces choses ?
[.............] by design
Human in the loop?
Quel droit avons-nous de rejeter un futur que nous n'avons pas pris la peine de penser ?

Futur en Seine / Cap Digital, 3 avril 2017
Do we have the right to reject a future that we didn't imagine ourselves?

Futur en Seine / Cap Digital, 3 avril 2017
Science finds,
Industry applies,
Man adapts

Exposition universelle, 1833
People propose,
Science studies,
Technology conforms

Don Norman, 1993
L'informatique doit être au service de chaque citoyen

Loi n° 78-17 du 6 janvier 1978 relative à l'informatique, aux fichiers et aux libertés